

REMARKS
ON
BURNS AND SCALDS,
CHIEFLY IN REFERENCE TO
THE PRINCIPLE
OF
TREATMENT AT THE TIME OF THEIR INFLECTION.

SUGGESTED BY
A PERUSAL OF THE LAST EDITION OF AN ESSAY ON BURNS,
BY EDWARD KENTISH, M.D.

IN WHICH
The experience of "THE MOST ORTHODOX IN MEDICINE AND SURGERY" is asserted; and the opinion "DIAMETRICALLY OPPOSITE TO THE POSITIVE DIRECTIONS OF EVERY MEDICAL AUTHOR, BOTH ANCIENT AND MODERN," is shewn to be formed upon an erroneous hypothesis.

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"The assignment of a multiplicity of causes, to account for particular phenomena, always betokens a backward state of knowledge. The business of Science is to generalise FACTS, to class phenomena under distinct heads, and to shew their dependance upon a common principle or cause."—*Motto*—KENTISH ON BURNS.

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“ If the subject be well understood, and there be a perfect accordance both in theory and practice, as to the general treatment of any disease, it would be superfluous to discuss the subject. But, on the other hand, where the most opposite and incongruous opinions are supported by characters of the greatest celebrity in our science, we may naturally conclude that the subject is not yet thoroughly understood.”

KENTISH ON BURNS.

ADVERTISEMENT.

SHOULD it be inquired why the following pages were not submitted to the Profession until so long a time has elapsed from the first publication of the Essay on Burns; I must observe, that I was precluded the opportunity of consulting that Work until the appearance of the last Edition. Upon this occasion I gave the subject the earliest attention I could conveniently bestow. I had been frequently placed in situations favourable to the acquirement of experience in the treatment of Burns: but this did not dissuade me from endeavouring to obtain further information. The practice therefore, but especially the theory of Dr. Kentish claimed my particular consideration, and subsequently suggested the present remarks.

17, *Wigmore Street, Cavendish Square,*

August 2, 1818.

PREFACE.

IT is hoped the following pages may be useful to the *general* reader. The object is to compare those means employed in the treatment of Burns and Scalds that have occasionally been deemed either useless or hurtful, with others regarded more beneficial, or at least, innoxious.

From such a view the number of valuable applications will be enlarged, by evincing the safety of such as are by some considered dangerous, and by affording an estimate of their relative virtues on the ground of experience, which has demonstrated their utility, and on the basis of science which refers their curative power to the influence of a common Principle.

Many facilities may thus, it is hoped, be

afforded towards alleviating the pain produced by injuries from fire at the moment of their infliction, when extra-professional aid must occasionally be resorted to in the absence of surgical skill.

To the *inexperienced* of the profession, these remarks, it is likewise hoped, may be useful in the early hour of their research, and serve at least as a central point round which an increasing series of examples and reasonings may be hereafter drawn; completing the deficiencies and correcting the errors of what is now submitted to their review.

To those whom experience has already enlightened, this small Tract is most respectfully presented. It is not addressed to the masters of the profession with the presumption of contributing to their knowledge, but in the trust that the relation of the facts and opinions it contains may yet deserve the sanction of their approval.

REMARKS

ON

BURNS AND SCALDS.

NO ACCIDENTS are more terrible in themselves than those from Burns and Scalds. It is probable that none excite in the sufferer such immediate and such serious alarm; nor are there any productive of more fatal consequences, especially when they occur to infancy and age.

There are many obvious reasons why the consideration of these accidents should be peculiarly interesting and deserving the attention of *general*, as well as professional readers. For injuries of this kind happen where surgical assistance cannot always be immediately obtained; the method of treatment does not require the exercise of manual dexterity; and what is still more important, the appropriate means are beneficial in proportion to their timely application.

It is indeed true, that an acquaintance with the PRINCIPLE upon which the virtue of any application depends, is grounded on medical reasoning, deduced from extensive experience; so as to make the management of any disease appear, perhaps, at a first glance, accessible only to professional inquirers.

Such is, however, the degree of advancement made in this department of medicine, that I trust it is very possible to conduct the general Reader to the best method of treating these accidents *at the period of their infliction*, (in the absence of surgical aid) with a promise of success, that shall render the subsequent duties of the professional attendant, not only free from the mischief of dangerous interference, but essentially assisted by the primary treatment of the un-professional adviser; thus leaving no cause *again* to lament the deficiency of “a chart to explain the means of affording prompt and instantaneous relief.” *

A *variety* of applications, the efficacy of which has been assumed to depend upon

* See Monthly Magazine, August, 1816.

varying and even *opposite* principles, having been recommended by different writers as equally serviceable in *similar* accidents from Burns and Scalds, each has in his turn advanced an opinion of the “*vague state of medical science and practice in these cases,*” from the want of a common principle to direct their treatment. This opinion, it is an object of these pages to consider. It has been variously expressed as follows:

“But what seems not a little surprising is, that even the best Surgeons should recommend Medicines of opposite Virtues in these accidents, namely, emollients, and astringents, attractives and repellents,” &c. &c.

VAN SWIETEN'S *Commentaries*.

Sir James Earle remarks: “There are few accidents or maladies to which mankind are subject, which have met with a greater variety of treatment than Burns; and, as it appears to me, these various methods have in general been received and adopted as things of course, and handed down without any fixed principle or determined idea annexed to them; as we continually see in similar cases of Burns, Scalds, &c. applications made use of which entirely vary from each other in their nature and effect.”

*Essay on the Means of lessening the Effects of Fire
on the Human Body.*

Dr. Kentish observes : “ when I first had my attention called to the state of the practice in Burns, in the year 1784, there was no aid to be derived from the perusal of medical authors upon the subject; their contradictory opinions left the mind in a greater state of doubt than it could have been in, previous to their being consulted.”—*Essay on Burns*.

Again : “ A person totally unacquainted with the subject, would acquire no certain information from Heister’s Institutes of Surgery: his judgment would be confused by the variety and opposite nature of the remedies recommended.”

Ibid.

“If the aphorisms of the learned Boerhaave, and the Commentaries of his laborious successor, were read to acquire information on the treatment of Burns, the reader must quit the investigation with increased doubt; for he is told he may use emollients, or astringents, or attractives, or repellents.”—*Ibid.*

“ Owing to the advancement of Pharmacy, the farrago of things recommended by the ancients has been discarded, but the contradictory means remain as before. Thus we observe, heat and cold, emollients and astringents, &c.”—*Ibid.*

“ A person ignorant of the treatment of such accidents, could not gain a precise knowledge from the perusal of the works I have quoted. He might as well write on slips of paper the different applications, roll them up, shake them in a bag, and dip for his chance, as to expect to be guided by a well-formed judgment from the authors above-mentioned.”

Ibid.

“ There is no accident for which we have a greater number of remedies, and at the same time, there is none where the curative power is less ascertained. Each family has its receipt, and each empiric his ointment.”

La Médecine éclairée par les Sciences Physiques.

These are a few of the opinions expressed on the “ vague state of medical science and practice in the case of Burn or Scald.” If, however, due consideration be given to the subject in all its bearings, this alleged discrepancy in the mode of action of the different external means so variously proposed, and so extensively employed, with like beneficial results in similar accidents, will I think be found rather apparent than real. It will be found, that in the many well-attested instances of their successful application, they have been beneficial by the influence of a common principle. At the same time, such principle has been occasionally lost sight of, in consequence of an erroneous impression that these various means possess the opposite effects ascribed to them, from the misuse of the terms “ emollient,” “ astringent,” “ attractive,” “ repellent,” &c. intended to express *peculiarity* of action, or “ spirituous

and aqueous, hot and cold," as indicating *opposition* of effects from their different constituents and external character.

From the proper and timely application of the variety of remedies adverted to above, there is in truth a common result. It is in proportion to their efficiency in subtracting preternatural heat and diminishing excessive action, that they are beneficial in the slighter injuries of Burn and Scald. In those accidents of more alarming severity, which are immediately followed by exhaustion, many of the same means have been experienced equally efficacious; but it has been by a different operation. This, however, will not be found to weaken the evidence of a unity of principle in their employment, but will be offered in its confirmation: for it is intended to be shewn that in the cases of Burns and Scalds, a difference in the *degree* of injury sustained, at length amounts to difference *in kind*; and likewise, that the same remedy, according to the peculiar mode of its application, will either diminish morbid excitement by abstracting heat; or will raise the energies of the system when suffering exhaustion as the

consequence of previous excessive action, by conducting the application with a view to support the *vis vitæ* through the agency of a moderate stimulus.

When heat is suddenly applied to a frost-bitten part, mortification commonly ensues.

Dr. Kentish observes: “When parts of the body, by the disease termed frost-bitten, have ceased to *act in unison* with the body to which they belong, great nicety is required to restore action to those torpid parts.”

It is wholly hypothetical to suppose that the parts attacked by frost-bite have their vessels *not* acting in unison with the body to which they belong; for the general circulation is depressed in proportion as the circulation of the part is languid. It appears that they cannot cease to act in unison.

“If the general circulation of the body is increased before the circulation of the torpid parts is restored, a solution of continuity would be the consequence.”

When a solution of continuity takes place (or the parts slough), it is not because the general circulation is increased before the circulation of the torpid parts is restored; but, either, because the circulation of the

torpid parts is excited into inflammatory action, by the violently stimulating topical application, and the slough is the consequence of such inflammation; or, because the part has been destroyed by the cold: in which case, acting on the living parts as a foreign body, it is thus removed, simply by the ulcerative process.

“Should the injury in frost-bite (Dr. Kentish further remarks), be of a magnitude to require medical aid by internal remedies, all such as are warm or stimulating ought to be avoided; for whatever would increase *the action of the heart and arteries, would increase the disease; as it would augment the disparity of action between the system and the torpid part.* The means of cure are, therefore, to increase the action of *the part*, by an increased degree of heat; and to diminish the action of *the system*, to meet the reduced action of the torpid part, so as to form a unity of action throughout the whole.”

Dr. Kentish does not particularize the means of cure in this case: but it should seem to follow, that as he dissuades from bleeding in burns, he would bleed in frost-bite.

When cold is suddenly applied to a Burn or Scald, “where the action of parts is alone increased;”——or, when the preternatural

heat is rapidly reduced by evaporation, no injury results therefrom.

These facts are confirmed by my own experience, as well as by the testimony of many authorities. I speak in this place only of the *safety* with which cold may be applied in all cases of Burns and Scalds, “where the action of parts is alone increased.” The *beneficial* agency of cold will require a distinct consideration. The question of safety may, however, be regarded as fully included in the opinion entertained of its positive efficacy, wherever such opinion has been founded on sufficient experience.

Having repeatedly witnessed the safety of cold applications to Burns and Scalds, I am desirous to bring the subject fully under the reader’s review: and I am hence led to recur to certain cases cited by Dr. Kentish in the Essay on Burns, from different writers, to “point out to us the *danger* of attempting to cure Burns and Scalds by the application of cold.”

In the interesting case of Miss Phillips (Monthly Magazine, August, 1816), the leading points which demand attention, are these:—

First, “The immediate inflammation was reduced by cold applications within three hours.”

Second, “The convulsions which commenced in eighteen hours, terminated fatally in forty-eight hours from the time of the accident.

Third, “Miss Phillips was under seven years of

age. That which led to the fatal termination, by the supervention of convulsions, was, in the opinion of the narrator of the case, “*an irretrievable indifference to the state of the stomach and bowels.*”

Fourth, The immediate inflammation was reduced by cold : but one of the cold applications is stated to have been “*goulard.*”

Unfortunately, we are not informed of the precise nature and extent of the local injury; of obvious necessity in comparing, or contrasting cases with a view to arrive at accurate conclusions. The “*previous florid health*” of the interesting sufferer, together with the “*violent excitement produced by the stimulus of the scalding water,*” as expressed by Dr. Kentish; and the “*irretrievable indifference to the state of the stomach and bowels,*” as mentioned by the narrator of the case, would be sufficient to induce me to refer the catastrophe to inflammation of the brain, and to entertain serious apprehensions from the neglect of general antiphlogistic measures; were it not also proper to consider how much of the mischief was due to the application of “*goulard.*”

In a case which lately occurred, the subject, a child of five years of age, had the lower extremities severely burnt by spirits of turpentine. Immediate relief was obtained by the application of cold. The infant continued free from pain during the day, and remained perfectly sensible until thirteen hours from the infliction of the injury, when he expired. The cold application

is stated to have been a mixture of the liquor *plumbi superacetatis* with linseed oil.

Perhaps the question on the *safety* with which cold has been resorted to in Burns and Scalds, should not only involve the consideration of the particular character of the injury itself, but likewise the circumstance of the application containing a mineral capable of inducing deleterious effects on the system at large.

I have not any experience of the effects of lead applied to Burns and Scalds; but am induced to advert to the subject at present from considering the relations given to me of certain cases in which the application of that mineral was deemed injurious; an opinion which appears to be entertained by Dr. Kentish. Dr. K. remarks: "In young subjects, where the injured surface is extensive, lead sometimes produces unpleasant effects upon the whole system, by being absorbed." Dr. Percival was likewise "inclined to be of the opinion of Dr. Baker, that lead, externally applied, will sometimes produce its specific effect upon the body." Dr. P. cites three instances in support of this assertion from his correspondent, Dr. Small; and details a very interesting case of Scald, in which the patient was greatly relieved by the application of goulard water; but the "constitution suffered by violent colic, trembling of the limbs, continual nausea, and frequent vomitings." See DUNCAN'S *Med. Com.* v. 3. Mr. White, however, in the same volume, remarks, "that by the application of *Gou-*

lard's aqua saturnina to a man *miserably scalded*, the relief procured was wonderful, and no bad effects followed."

See also observations on the external use of preparations of lead, &c. page 10, by John Aikin.

The preference given by the narrator of Miss Phillips' case of spirituous to aqueous applications in an affection of the skin from Scald, *where the epidermis remains entire*, has a foundation equally in experience and in principle. The agency of each in curing Scalds is derived from their relative power of abstracting preternatural heat, and from the consequent reduction of morbidly augmented vital action. The method advised by Mr. Parkinson in the fifth volume of the *Memoirs of the Medical Society of London*, "of covering the parts aggrieved with bladder of the greatest tenuity, which is to be kept constantly moistened with alcohol" (the good effects of which Mr. P. justly ascribes, "to the degree of cold generated by evaporation")—is particularly adapted to severe cases, where the cuticle has been removed; when the epidermis is detached in cases of less moment, it is equally serviceable to bathe the parts frequently with *diluted* spirits, keeping them covered in the interim with cloths wet with the same application. The object being to abstract preternatural heat as speedily and as completely as possible, the direction given by Heister correctly applies. "These applications are of little or no use unless frequently

repeated." Such, likewise, was the observation of Sydenham.

The next case to which Dr. Kentish adverts, as requiring considerable attention from *him*,—suggests also to *me* much information in point. It is that related by MR. EMASLE: in which he directed, (immediately upon the infliction of a Scald) the part to be exposed to a stream of cold water. "On the evening of the same day the patient walked about without suffering any pain."

Dr. Kentish "admits in this case the benefit of the application of cold water;"—"but, (he rejoins) I must deny that the morbid action occasioned by heat, had taken place."—"If a hot fluid be applied to the surface of the body, and it be immediately succeeded by cold water, before it has imparted its heat to the body, or excited a morbid action in the part to which it has been applied, then it will be clear that the cold water has prevented the disorder. But prevention is not cure." In the case, however, related by Mr. Emasle, "the cuticle peeled off some days after,"—a proof that the morbid action occasioned by heat, *had* taken effect beneath the epidermis.

If, under these circumstances, as admitted by Dr. Kentish, the application of cold prevents the disorder; should not so valuable a prophylactic property prove the strongest recommendation of a mean, which Dr. Kentish says, in general terms, "*his practice condemns?*" But what period, I would ask, elapses from

the infliction of a Scald, to the establishment of the disorder it occasions? What period elapses between the application of a hot fluid to the surface of the body, and the time when it imparts heat or excites a morbid action? If not absolutely simultaneous, yet the suffering of the patient is so instantaneous as not to afford any appreciable interval between the accident and its effects. Pain is the immediate consequence, as almost every person has experienced, of the contact of disengaged caloric. It takes place too suddenly to admit of prevention: but the means of promptly obviating its further effects are undoubtedly prophylactic of the evil that might result from delay.

Dr. Kentish, however, does not alone admit the *preventive* power of cold in its immediate application to Burns: for he further observes, “nor do I mean by this to deny, that the morbid action, excited by heat, has not been *cured* by the continued use of cold, as well as by many of the *absurd* remedies we have seen recommended.”

In this case the application acknowledged to be preventive by Dr. Kentish, and also granted to possess the power “to cure the morbid action excited by heat,” is censured as *unsafe*, and associated with measures that are considered *absurd*.”

Does not the admission both of a prophylactic and curative power in cold, in the circumstances under present consideration, evince that opinion to be founded in error which would establish as a practical

guide “ the *danger* of attempting to cure Burns and Scalds by the application of cold?” although in certain states produced by this class of injuries, hereafter noticed, it may be deemed inadmissible.

The case cited in the Essay on Burns from RICHERAND, with the same view, of interdicting the employment of cold, presents an example of so great severity, that “ *the entire surface was roasted from the head to the feet.*”

Now I consider the state of the patient in this case, to have been of that formidable character in which exhaustion of the vital energies had already succeeded to increased excitement. The practice, therefore, should have been to support the *vis vitæ*, both of the system generally, and of the part more immediately involved in the particular injury.

This case does not, in my opinion, “ *enable us to see the effect of cold applications and copious bleeding*” under the circumstances in which these means can be duly appreciated. Moreover, it is deserving remark that the application was not simply a mean to reduce preternatural heat and increased vascular action, but the lotion contained a mineral impregnation of, probably, pernicious effect. Neither does this instance quoted from RICHERAND present any reasonable objection to the practice of Professor DZONDI, (of Boerhaave, and many other writers, who have discussed the method of treating Burns and Scalds) who says, “ if the *inflam-*

matory affection of the nervous system should require a particular treatment, it can be no other than the antiphlogistic." But the bleeding and cold lotions would not accord with the principles of Professor Dzondi, when employed in a case analogous to that transcribed from Richerand ; because the inflammatory affection was immediately succeeded by exhaustion. The antiphlogistic regimen had, consequently, here no place. For I must now repeat, that in Burns and Scalds, a difference in the *degree* of injury sustained, at length may constitute difference in *kind*.

In the case from Richerand, the patient fell a victim to the *extent* of the injury from the large surface burnt.

The bleeding was injudicious by disabling the patient from bearing the dreadful exhaustion and pain. Opium would have been better: although, perhaps, every plan would fail in a case of such severity, that "the entire surface was roasted from the head to the feet;" but the failure would not afford any argument against the *principle* of Richerand or Professor Dzondi.

In the case of frost-bite, there is depression of the powers of life ; and mortification will be the consequence of exhaustion from the excessive re-action produced, if the stimulus of heat be suddenly applied. We have here, in the first place, torpor from de-

ficiency of heat: then inordinate excitement from the sudden excess of the same principle. Ultimately, mortification as the result of over exertion of the vital energies.

In Burns and Scalds “where the action of parts is alone increased,” the further augmentation of such “increased action” is liable to induce effects analogous to those which occur in frost-bite. Hence, the increased action in Burns and Scalds should be reduced, as soon as possible, to the standard of health.

This may be attempted immediately upon the infliction of the injury, without the hazard of mortification, as in the converse; because there is nothing to apprehend from the instantaneous reduction of *morbidly* increased heat and action, which is at all analogous to the exhaustion in frost-bite, produced by the sudden application of the stimulus of heat to a part rendered torpid by previous cold.

The appropriate method, therefore, of treating Burns and Scalds, of the particular description referred to above, cannot be deduced from a consideration of the principle which determines the treatment of frost-bite. The

conclusion we might form, by looking at the converse, would not obtain.

“ Professor Dzondi proves cold water to be the first, greatest, and most powerful, nay, the only remedy, for preventing the most dreadful consequences in cases of Burns, if timely applied, and with perseverance.—His conviction of its efficacy is partly founded on a multiplicity of experiments made on animals and on himself, and partly results from his successful treatment of many important cases.”

Medical and Physical Journal. September, 1816.

Upon this practice, Dr. Kentish observes, “ This is professor Dzondi’s mode of curing Burns. Let us look at it in the converse when it would stand thus.” Namely, that the most appropriate method of curing frost-bite would be the application of heat.

But does it follow as a legitimate inference, because “ cold, applied betimes and with perseverance, obviates the effects of heat,” that “ by looking at the converse,” the proper method of curing frost-bite should be the opposite extreme. Both principle and practice are against the conclusion. Nor is such doctrine proposed by Professor Dzondi.

Instead of rejecting the principle of the Professor, as he applied it solely to the management of Burns, Dr. Kentish refers to what *might* be considered Dzondi’s practice in a case of frost-bite, on the

supposition that he *must* form his rule of conduct “ *by looking at the converse.*”

But on what grounds are we to conclude that Professor Dzondi extended his practice in Burns to the consideration of the method of treating frost-bite?

Dr. Kentish says, “ such *would* be the Professor’s practice in frost-bite.”——“ Surely,” he rejoins, “ it were better that all the people in Canada should die, than that Professor Dzondi’s principles should be doubted!” “ Such doctrine was preached by Dr. Sangrado to his pupil Gil Blas, with respect to bleeding and hot water, in the treatment of his patients at Valladolid.” In answer to this, I have only to say, that an extended experience convinces me of the perfect safety with which cold may be applied to Burns and Scalds, “ where the action of parts is alone increased;” although heat cannot be suddenly applied to frost-bite without the risk of producing mortification.

Whenever a Burn or Scald does terminate in mortification, it must take place from exhaustion of the powers of the system produced by previous violent excitement. Hence there is a singular affinity between the fatal termination of frost-bite, in consequence of the

sudden application of heat inducing inordinate *re-action*; and the analogous result in Burns and Scalds, in which mortification also ensues from exhaustion of the vital energies by excess of action.

For such fatal issue in Burns and Scalds never results from the application of refrigerant and sedative means employed to reduce the morbidly augmented heat and sensibility of the injured part: it results, on the contrary, either from the misapplication of stimulants which continue the increase of heat and vital action produced by the irritation of the Burn; or from withholding the employment of measures that would be efficient for their reduction.

In both examples, the mortification proceeds from the same *immediate* cause, produced *directly* in the case of Burns and Scalds, *indirectly* in the frost-bite. In the latter, the sudden application of stimulants to a weakened part first occasions dangerous *re-action*, then consequent exhaustion. In the former, the action *already* in excess is continued and increased by further stimula-

tion, until debility and mortification is the common result. It must be obvious that the fatal termination of Burns, adverted to above, has no allusion to the primary destruction of parts by the contact of caloric, which in a violent degree at once destroys life by the power of its chemical agency.

When heat is applied to the surface of the living body, so as to occasion a Burn or Scald, its effects will vary conformably with the violence and extent of the action of the exciting cause and the constitutional diathesis upon which it operates. The same degree of injury varies in its consequences as it occurs to different subjects; to infants or aged persons, or to those who are considered in the prime of life.

“ If,” says Mr. Pearson, “ a living animal be confined in a degree of heat a little below that which would produce coagulation, although the primary effect would be a contraction of the living fibre, yet, by supporting a violent and unnatural degree of action in the moving parts, the powers of the system would be gradually exhausted.”

Principles of Surgery.

It is, however, observed by Dr. Kentish, “ There

may be a difference in the degrees of injury, but there can be no difference in the kind."

"Injuries caused by a pernicious quantity of caloric suddenly applied to any part of the body, ought to be termed *local injuries from increased action*."

Dr. K. remarks, nevertheless, in another part of the Essay on Burns, "The excessive stimulus of fire, and the irritative fever kept up from this stimulus, exhausted the system"—"the whole train of symptoms was the consequence of debility, from the exhaustion of the vital power by excess of action."

Within certain limits, the sensibility of the injured surface will be painfully augmented—a determination of blood to the part will ensue, accompanied by increase of heat and vascular action.

In a somewhat higher degree, serous effusion will take place in some parts, while in others the surface may be actually destroyed;—the vicinity, not involved in this complete destruction, being in the state of increased excitement mentioned above.

"When heat is considered with relation to the senses of an animal, it may be regarded as a very powerful stimulant, inciting the moving powers of the living fibre to action; but

when it is viewed with reference to its absolute effects on matter in general, it will appear to be a very active and potent chemical agent, capable of destroying the contexture, and separating the component parts of bodies."

PEARSON'S *Principles of Surgery*.

So long as the local injury is within the limits of increased action, (although attended by vesication from serous effusion in some parts, and in other parts by the complete destruction of a certain extent of surface), the general derangement of the system will participate in kind, and in degree, proportioned to the severity of the topical affection and constitutional *diathesis*. The symptoms of this derangement are, a shivering succeeded by heat—increased action of the heart—thirst—white tongue—high colored urine—constipation of the bowels: sometimes hurried respiration—head-ach—*phrenitis*—*coma*. In a word, to adopt the language of Nosologists, it is *cauma* or *synocha* arising in the system from topical inflammation.

"Burns very nearly resemble inflammations—each degree of them is marked by nearly the same indications."—HEISTER.

"The different degrees of these several effects from burn-

ing, resemble those observed from the first and slightest degree of an inflammation, till it degenerates into the worst, or most severe spachelus.”—VAN SWIETEN.

“ The inflammations produced by Burns are of the most painful kind.”—RICHERAND.

“ Burns, which do not destroy the cuticle, and which irritate the skin only, act nearly in the same manner as cantharides and other Vesicantia.”—B. BELL’S *System of Surgery*.

“ In deep extensive Burns, mortification sometimes takes place to an alarming degree, very soon after the injury is inflicted: but, for the most part, the symptom we have most to dread is inflammation.”—IBID.

“ When the body is extensively injured, the accident is often immediately succeeded by rigors, and a temporary depression of strength; but the subsequent symptoms are commonly such as to indicate the presence of inflammation.”

PEARSON’S *Principles of Surgery*.

“ There is first pain and inflammation; presently afterwards, the exhalant arteries, being excited to action, will effuse a quantity of serum under the skin, and raise the cuticle like a blister.”—REES’S *Cyclopædia*.

“ The immediate consequence is a greater or less degree of inflammation.”—*Encyclopædia Britannica*.

The opinion expressed by the authorities quoted, of the *inflammatory* character of the injury produced

by Burns and Scalds excited within the degree “where the action of parts is alone increased,” is strictly in unison with the experience which has led me to regard the local affection in *that* point of view, and the general derangement of the *same* kind.

But Dr. Kentish expresses a different opinion, and builds his practice upon the consideration of a “disparity of action between the injured part and the rest of the system.” “The mode of relief, (he observes) will therefore be to restore the unity of action, by gradually diminishing the increased action of the part; and by increasing the general action of the system.”

In these cases of injury “caused by a pernicious quantity of caloric suddenly applied inducing *increased action*, the internal means of relief will be to administer those substances which will, in the *quickest* and *speediest* manner possible, throw the heart and arteries into the *most violent action compatible with life*. By these direct stimulants internally, the circulation will be carried to the *greatest possible degree* of quickness, by which means there will be infinitely less disparity of action between the part excited by the Burn, and the general system, than by any other manner of treatment.”

Now if the circulation be carried to *the greatest possible degree of quickness compatible with life*, inflammation must be the result. Dr. Kentish as-

sumes that the cause of the mischief in Burns, arises from the system remaining in its ordinary degree of action, while the action of the part burnt is extraordinarily increased, disparity being thus produced between the action of the part and the whole.

What proof is there that such disparity exists? and, if it does, why is such a disparity injurious? It is so erroneous to suppose that the imaginary destruction of this equilibrium produces the ill effects spoken of, that in reality they are produced by the very unison which is instantly established between the action of the system and of the injured part, occasioned by the immediate sympathizing of the constitution. When the injury produces increased action of the part, if the example be one of much severity, the general system will sympathize; the action of the heart will be augmented, and synocha will result.

If the injury be still more violent, the irritation will be so great as to exhaust the powers of the system generally; and mortification of the part will very probably ensue. Should the morbid excitement be subdued in the first example by antiphlogistic remedies, the health returns; so likewise in the second example, if cordials and stimulants are employed with a moderation proportioned to the measure of exhaustion. But, if in the first case violent stimulants are resorted to, visceral inflammation will most probably result; and if the same violent stimulants are made

use of in the second case to overcome exhaustion, they will either rapidly sink the remaining powers of the system beyond repair, or occasion a dangerous reaction.

Dr. Kentish remarks, in opposition to the “ uniformity of opinions among all preceding authors :” “ As it appears to me, that the too general acceptance of the similarity of burn and inflammation has led to erroneous conclusions, I must, therefore, venture to deny, that a burn is an inflammation, though it may, in its consequences, produce an inflammation. I may be wrong in this assertion ; but at least it has the merit of novelty for its recommendation.”—“ I regard the first action of caloric upon the system as an irritation.”

If this opposition to all preceding experience were merely a verbal disagreement, it could scarcely be considered as worthy of discussion. But if a particular practice should be advised upon a novel speculation, arising from this difference of opinion, the subject acquires a more important interest. It is, therefore, a first object of these remarks to point out to the inexperienced reader, that injuries from Burn and Scald may differ in *kind* according to their *degree* ; and that the general state of the system in *each* class, participates with that of the topical affection. Thus,

1. In comparatively *slight* cases the local mischief is strictly inflammatory, and the general system, in-

stead of differing from, participates with, the topical affection, as the symptoms plainly manifest.

2. In *severe* examples, the sudden and inordinately increased action is rapidly followed by exhaustion of the *vis vitæ*, both in the part injured and through the system at large.

3. Independently of these states of increased and of exhausted vital action produced by Burns and Scalds; a shock is often experienced, especially by aged persons and children, which occasionally destroys life, where the degree of injury, abstractedly considered, should appear inadequate to the production of such fatal effect.

4. Besides these general considerations, as arising at the time of the infliction of the accidents here recurred to; and from which must be formed the principle of affording prompt and instantaneous relief, when it is more particularly within the reach of professional aid, a varied line of conduct may be subsequently required to bring the patient to a state of health; which can be determined only by the precise nature of the individual case, from the effect of the measures adopted in the first instance, and from the change that may take place in the progress towards a cure.

When a Burn or Scald is very extensive, or

particularly severe, the increased excitement induced by so inordinate a stimulus, is sometimes rapidly succeeded by general debility, insomuch that mortification and death will be liable to ensue from sudden exhaustion of the vital power. It is in this case that a difference in the scale of *degree*, as already mentioned, at length rises to a difference *in kind*. The symptoms are, continued shivering, small and frequent pulse, great debility, and the mortification of parts involved in the injury, which were not, at first, destroyed by the actual contact of the injurious caloric: the eschars produced by which, do not come within our present consideration.

In severe Burns, in which there is considerable disorganization of parts by the contact of disengaged caloric; or, when in severe Scalds the immediate consequence of increased action is serous effusion, the first symptoms of inflammation being subdued, a tedious process oftentimes awaits the cure. The animal œconomy has much to accomplish, and the surgeon is particularly called for to give his aid. Under this process of the renewal of parts, thus disorganized or totally

destroyed by the chemical agency of the hurtful power, the constitution may suffer differently in kind—more or less in degree, conformably with the particular character of the local injury, and the peculiarity of temperament, age, sex, general state of health, &c.

Besides the local injury and the concomitant or consequent general affection, in very severe Burns and Scalds, there is often experienced a singularly alarming seizure or shock of the nervous system. It is sometimes manifested by a degree of irritation and dread—of sudden horror—impatience—trembling and shivering, apparently disproportioned to the extent of real suffering. For tranquillity often succeeds this shock without sufficient time being allowed for the alleviation of pain in the parts which have sustained the injury. Indeed, the patient will be almost frantic from sudden alarm at the effects of fire upon his person, with much less absolute suffering of pain than on other occasions he would bear with a becoming fortitude. This suffering of the nervous system is something very peculiar, and perhaps, little understood. I

have reason, however, to know from experience of the fact, that weakly and irritable constitutions, especially aged people and children, have been suddenly carried off by the overwhelming impression of this shock; on occasions when, to every appearance, they might have incurred little danger from the extent and degree of injury, abstractedly considered.

The pain occasioned by Burns and Scalds demanding at all times immediate relief, a variety of applications has frequently been resorted to in the moment of emergency, without either reference to principle or to any prior evidence of their utility: yet often with such decided advantage as to procure their future recommendation on the ground of experience alone.

If, however, we carefully attend to the circumstances of the case, both in relation to the particular state of the parts involved in the accident, and also to the mode of action of the measures ascertained by experience to be beneficial; although they should possess very different constituents and external characters;—as, for example, spirits of wine

—ether—oil of turpentine—goulard—cold and warm water, ice, &c.; yet I do conceive, as I have stated already, we shall not have occasion to lament the want of a common principle, to account in a satisfactory manner for remedial results so remarkably similar, under circumstances apparently opposite; notwithstanding we should be variously determined in the preference we may be induced to give to the one or the other.

Mr. B. Bell advises cold water, boiling water, ardent spirits, goulard, solution of alum, common ink; but he considers them “of very different, and even of very opposite natures.”

Heister likewise recommends ardent spirits, and also oil of turpentine, “if it be early employed.” And Sydenham assures us, that spirits of wine is preferable to any other remedy, if the application be repeated till the pain is entirely removed.

Sir James Earle enumerates a variety of external applications, which he, also, considered to “entirely vary from each other in their nature and effect.” Thus, he mentions spirits of wine, saturnine applications, vinegar and water, fine oatmeal and cold water, warm spirits mixed with vinegar, potato juice and distilled water, oil, lime water, &c. “These (Sir James remarks) suffice to shew the common

practice, and to prove the discordance and uncertainty prevailing in the treatment of Burns."

I am led, however, to consider the above mentioned applications, as being productive of beneficial effects by the action of a common principle; and that they have failed in their curative power, only, in such accidents as by their greater violence were not amenable to the same common principle. The entire change induced in the nature of the morbid state by the greater degree of injury inflicted, demanding on these occasions an entirely different plan of management.

See Medical and Physical Journal, v. 17, p. 1.

Besides the diversity of applications adverted to above, some others have received the sanction of medical opinion: the nature of whose remedial operation, may be considered less susceptible of elucidation.

Thus it has been advised to expose the burnt part to the fire, "and to hold it so exposed, as near, and as long as the pain will allow."—"Fire itself, applied near to a burnt part, is its own antidote, to drive out the fire."

The explanation of this statement of the curative operation of fire in Burns, is assumed

to accompany the announcement of the alleged fact: with respect to which I must observe, that I have tried this experiment in my own person on a small scale; and I am acquainted with others who have done the same; but not with so much advantage as to authorise its recommendation; although, I must add, that some practitioners have reported upon this plan of treatment more favorably than my experience can warrant. Whether extensive Burns have been subjected to this peculiar process “to drive out the fire,” I am uninformed.

Howsoever discordant the theoretical opinions of different practitioners may have been concerning the treatment of Burns and Scalds: however opposite in their external characters or essential constituents, may likewise have been the means diversely employed to fulfil their various intentions of cure (with the exception of fire “to drive out the fire,”) the records of experience proclaim their general utility to have been evinced upon the most important occasions.

The beneficial agency, indeed, both of warm and cold applications;—of spirits of wine, and

also of water, in Burns and Scalds, “where the action of parts is alone increased,” has been established in my mind from personal acquaintance with their efficacy, derived in the early part of my professional life from an attendance on the injuries sustained by Burns in an extensive colliery:—since that time from the opportunity afforded during a long period of military service, and from the occurrence of like accidents in private practice.

Whether cold or warm water, ice or spirits, oil of turpentine, ether, fluor volatile alkali, brandy, goulard, new cream with linseed oil, raw potato, ink, vinegar, &c. be the means applied to cure a Burn or Scald, “where the action of parts is alone increased,”—one circumstance is essential to the success of their remedial character: namely, that the application be of a less degree of temperature than the injured parts to which it is applied; or, that the application possess the property of conducting preternatural heat from the injured surface, by evaporation. Upon this relation depends the common principle of their action, and the apparent discrepancy in the similarity of success so often

observed to attend the employment of such various means (cold and warm, aqueous and spirituous) in analogous cases is explained by referring their beneficial effect to the property each possesses, in different degrees, of diminishing the sensation of heat in the burnt or scalded part, and thence removing the local pain, and concomitant general symptoms of derangement. Their relative degrees of efficiency in abstracting morbid heat, and thence reducing morbid increase of action, may be easily determined. Such of them, as possess the lowest temperature, on the one hand, or produce the speediest evaporation on the other, are consequently the most effective. It is necessary to guard against any mode of using the spirituous applications by which they would induce a stimulant agency. For if the operation of these different means was not to diminish heat when thus applied to Burns and Scalds; if they should, on the contrary, communicate caloric where it is already excited in excess: Or, if they could exercise any other mode of stimulant agency independently of their temperature, so as to increase instead of diminishing excess of heat and vital action:

In such case, we might look for exhaustion and mortification—for a parallel between the *direct* consequences of applying heat to Burns; and the same result *indirectly*, from suddenly applying stimulants to frost-bite.

Difficult as it is to avoid the effects of inordinate re-action in parts rendered torpid from cold, by the subsequent sudden application of great heat with other stimulants, it is not easy to reduce *excess* of temperature in the living system, either suddenly or with permanence, below the standard measure of health. The increase of vital action, and the afflux of blood determined to a part by the powerful stimulus of disengaged caloric, will continue to augment the animal heat, and protract the morbid state, so as to produce the accession of symptomatic or sympathetic fever.

Hence, in Burns and Scalds, when “there is increased action alone,” we have nothing to apprehend from the sedative operation of cold applications; or from those which rapidly abstract caloric by their evaporation. They will neither induce torpor nor subsequent dangerous re-action: but will prove highly

beneficial in subduing the local affection *in limine*, and thereby preventing general inflammation.

“ Dr. Kinglake observes: “ An early and unremitted application of cold water has, in numerous instances of Burns and Scalds, under my direction, afforded every aid that either the patient or practitioner could reasonably require.”

Medical and Physical Journal, vol. 15.

“ I find” (says Mr. Harrup) “ nothing more is necessary (in extensive Burns and Scalds) than to keep the injured parts covered with several folds of old linen well soaked in a weak solution of *cerussa acetata*. So uniform has the success of this application been, that in a great number of very extensive Burns and Scalds, not one has occurred where I had occasion to change the method of treatment.”

Ibid, vol. 17.

Dr. Hall remarks: “ in our hands topical cold has uniformly proved a *prompt, easy, and efficacious* mode of relief.”

Ibid.

Dr. H. brings forward several cases in proof of his assertion.

Dr. M'Dowell of Pennsylvania reports upon two cases of Scalds “ which were *speedily* and *completely* cured by the application of *cold* water.—*Ibid*.

“ The decided advantage of cold applications in the acute stage of Burns and Scalds, is so immediate and remarkable, that cause and effect cannot be more pointedly connected.”

—“ If there is any meaning in the comparison of ‘ a medicine acting like a charm,’ the operation of cold on these occasions may be considered as an example.”—*Ibid.*

“ In all case of Burns and Scalds, in which though the cuticle is raised in blisters, it still remains to cover the cutis, the application of cold water has been so universally successful, that I have never thought it necessary to seek for a more efficacious one.” *Vol.* 18.

Dr. Stock observes on the use of cold in Burns, that “ refrigerating applications present so obvious a mode of relief, and are so readily obtained, that they have been resorted to almost universally,” and he supports his opinion by a reference to cases.

See Medical Collections on the Effects of Cold.

Sir James Earle observes: “ Since I have found the advantage arising from ice, I have had many opportunities of using it on large and extensive Burns, which have served to confirm me in my good opinion of its beneficial effects, whenever it has been timely and properly applied.”

Richerand remarks: “ By the continued application of refrigerants, we prevent, in some measure, the inflammatory re-action of a part, upon which boiling oil or water has been thrown, by keeping it plunged for many hours in a bath of icy cold water. When, notwithstanding, the free use of these means, inflammation ensues, it is necessary to treat it on the antiphlogistic plan.”

Mr. Pearson advises, "Cold, not in a degree to reduce the heat below the natural temperature, but only to lessen the heat, by restraining the immoderate action of the blood-vessels."—Mr. P. recommends also bleeding, purging, and abstinence.

Principles of Surgery.

"If the skin remains whole, and the accident be recent, we should have recourse to cold applications, to discuss inflammation and abate pain. Also, spirituous applications, which produce cold by evaporation.—If the inflammatory symptoms run high, the antiphlogistic regimen must be observed."

Rees's Cyclopædia.

See also *Encyclopædia Britannica.*

Dr. Cumming relates, "A sergeant of marines was scalded; part of the leg, the whole of the ankle, and upper as well as lower part of the foot, were vesicated. He was ordered to place his foot and ankle in a bucket full of cold water, which immediately relieved him from the excruciating pain he complained of; and when it became necessary to renew the water, which was frequently done, when it acquired a certain degree of heat, imparted to it from the inflamed limb, he was extremely anxious for a fresh supply, for the colder the water was, the more comfortable he said he felt the part affected."

Med. and Phys Journ. Vol. XIV.

"Cold," says Dr. Thomson, "is a remedy which has long been employed to diminish the inflammation of superficial Burns. Rhazes directs, that, in recent Burns, cloths dipped in cold water, or in rose water cooled with snow, be applied as soon as possible to the parts which have been injured, and

that these cloths be renewed from time to time; and Avicenna says, that this practice often prevents the formation of blisters.—The form of cold applications may be varied to infinity, but a sudden relief from pain is an effect which is common to them all. In proportion as the coldness of the application which has been made to a recent Burn diminishes, the pain returns.”

Lectures on Inflammation.

With these facts my experience accords. To the power of diminishing heat by an application which possesses a lower degree of temperature than the injured part, is to be ascribed the “cooling and grateful effects of the application of vinegar,” recommended by Mr. Cleghorn in the Medical Facts and Observations; as well as the “return of the uneasiness when the vinegar is too early discontinued;” so that (Mr. Cleghorn remarks) “the patients themselves seldom fail of giving their active assistance in this operation of wetting the parts affected.”

Mr. Cleghorn, however, attributes to the chemical character of vinegar, that efficacy which I ascribe to the application of a mean remedial by the exclusive agency of diminishing preternatural heat. In those cases in which Mr. Cleghorn “warmed the vinegar to nearly blood heat to obviate chillness and shivering,” and in which he also administered moderate warmth and cordial support, exhaustion had supervened to excessive action, when no practice could be more judicious than his. It had principle for its foundation, and experience to support it.

I shall here interpose the remark, that in almost every severe case of Burn and Scald, there arises soon after the infliction of the injury a sense of coldness amounting to shivering. This commonly goes off soon; and in those cases in which “there is increased action alone,” the symptoms of inflammatory fever supervene. But when the injury has been more violent; when exhaustion has followed inordinate excitement, the shivering is severe and long continued, and seldom followed by re-action. Mr. Bell remarks—

“In very extensive Burns, where nearly the whole surface of the body is affected, the patient is always seized, soon after the accident, with violent shivering, and at the same time complains of most excruciating burning pain. During this stage, the pulse is so small as to be scarcely perceptible; and, in many cases that I have seen, it could not be felt at the wrist.” *Medical and Physical Journal*, Vol. III.

The above citations are strongly in proof both of the safety and efficacy of cold applications, when timely and properly applied to Burns and Scalds. To these authorities I must add the frequent result of my personal experience, with that of some of my most respected colleagues, who have laboured in the same field of public duty.

In the case of Miss Phillips, referred to page 9, Dr. Kentish concludes from “having once seen a similar effect produced upon a child in scarlatina by

cold affusion; that the application of the cold lotions produced such a torpor on the parts, as to affect the brain by sympathy, thus producing convulsions terminating in death." How a torpor affecting the brain by sympathy could produce convulsions it is difficult to guess. Nevertheless, I do believe, the brain to have been affected by sympathy; but I apprehend this organ sympathized with the more immediate effects of "the florid and healthy state of the subject, together with the violent excitement produced, (as remarked by Dr. Kentish) by the stimulus of the scalding water;" to which should be added, the "irretrievable indifference to the state of the stomach and bowels." The quotation from the Essay on Burns, p. 14, should seem to pronounce the author somewhat in favour of cold applications to Burns and Scalds, both as a prophylactic and curative mean; yet, in another part of that work, Dr. Kentish is decidedly against the use of this remedy. He observes, "from the principles which govern my practice, it will be seen that cold to the surface in the first stage of the injury, is to be carefully avoided."

Without wishing to lay particular stress on the following analogy as affording a ground of argument, it may, nevertheless, be useful to remark how frequently are experienced like good effects (as in the application of cold to

Burns and Scalds) from the employment of warm and cold ablutions, with a view to reduce preternatural heat, in those ardent febrile affections of the torrid zone, in which the most important organs are often deeply involved in the inordinately increased excitement resulting from the application of solar heat with other stimuli. These general ablutions, like the topical application of cold to Burns and Scalds, require frequent renewal to insure a decided effect.—The heat of the surface being, for instance, 110° of Fahrenheit, will, probably, be soon reduced to 98° , but seldom, permanently, lower than this: although the ablutions are continued; and it requires their continuance or at least their frequent renewal to maintain the desired effect when once produced; for the morbid heat re-accumulates with great rapidity.

Upon these occasions, water at 96° will often be efficient in abstracting the excess of temperature, from the evaporation produced by the patient being placed in a current of cool air during the ablution. Much colder water is more immediate in its remedial action—still more so, when there is any con-

siderable admixture of alcohol:—while I must remark, that the application of undiluted spirits is yet more efficient than water in reducing the excess of caloric in the system, for a reason too obvious to repeat.

The practice of the old woman was good; and had its foundation in a just principle, (although it is probable she was entirely ignorant of all theory), who acquired celebrity in the treatment of Burns, by washing them with gin, as communicated by a Physician to Dr. Kentish.

To return from this digression: While the local injury is within the limits of increased action; however severe the degree or extent, if the general system suffers derangement in consequence; such derangement will be marked by the symptoms of high excitement; by augmented action of the heart, head-ach, &c. as already mentioned. *Page 23.*

When, therefore, these symptoms of general disturbance arise, participant of the topical injury; they must be subdued by the ordinary measures for reducing increased excitement of the system: by bleeding, aperients, and the antiphlogistic regimen.

These means should indeed be adopted, agreeably to the degree of injury inflicted, as soon as possible after the accident, with a view to alleviate existing symptoms, as well as to prevent the general sympathetic affection.

Dr. Kentish observes: "All, when they speak of means to abate fever, and prevent inflammation, uniformly recommend the antiphlogistic regimen. This is a principle in which all agree. But as it is a principle in which I do not agree, it forms one of my chief motives for venturing to address the public on the subject."—Again: "It is with respect to the internal treatment of these accidents, that we find uniformity of opinions among all preceding authors. They regarded a Burn as an inflammation, to reduce which they recommended bleeding, purging, and, above all, a low diet. Their opinions had acquired *sanctity from usage*; and the doctrine of implicit obedience, inculcated by the schools, induced perfect submission. The licentiousness of the present æra, may induce us to throw off such restraints, and fall into an opposite error." Here I accord with the writer of the "Essay on Burns," who adds in a note, "This was written in 1797, during the effervescence of the French Revolution, when the principles of all sciences were shaken to their very foundation." It is very true, that many of the Professors were shortened

by the head: but I can scarcely imagine the *Principles of Science* to have suffered thereby.

With the opinions of preceding authors, as stated by Dr. Kentish, my experience obliges me to coincide. Conformably with the admission of Dr. Kentish himself, that “there is no doubt but the effects of heat are to quicken the circulation of the blood, and increase the sensibility of the system,”—I must continue to use and to recommend in the cases of Burns and Scalds, “when the action of parts is alone increased,” the antiphlogistic measures mentioned above, without any objection to their having “acquired *sanctity from usage*.”

In those cases of Burn and Scald, in which the cuticle is not destroyed: (although such accidents may be of dangerous import from the extent of surface more slightly injured), the more promptly we apply the means of reducing the excess of heat and vital action; and the more pertinaciously we continue their employment, the more immediate, complete and permanent, will be the relief we shall afford: and the better will be the chance of preventing vesication, from the termination of increased action in serous effusion; and of sympathetic fever from general increased

excitement. Here—spirits of wine, fluor volatile alkali, ether, oil of turpentine, gin, brandy, diluted spirits, ice, cold water, goulard, warm water; or any other means possessing the power to abstract preternatural heat from the injured part, may be copiously and assiduously applied.

When a severe Burn or Scald occasions on one part of the surface redness with the painful sensation of intense heat—in another part vesications from serous effusion; while other parts are actually destroyed by the contact of the injurious caloric, the principle we must adopt in the management of such a case of complicated injury, must be founded upon the effect produced on the general system, on the one hand; while, on the other, the topical treatment will require a modification adapted to the varied condition of parts as they may be differently affected by the particular injury.

When the epidermis remains entire, the best applications have been already enumerated. If the cuticle be detached, alcohol can only be applied in a dilute form, or in the manner recommended by Mr. Par-

kinson, page 12. Intense cold, where the injury has produced very severe effects, is, in this case, sometimes found to be too stimulant by the sensation it excites in the exposed nerves, which are rendered occasionally so susceptible, as not to bear with impunity the contact of even cold air. The best applications in this emergency will be found diluted spirits—tepid water—olive or linseed oil—carron oil—Goulard's cerate, or essence of turpentine reduced by admixture with oil in the manner recommended in the *Cyclopædia*, “to prevent its giving insufferable pain.”

When a part of the surface is totally destroyed by fire, it is of no consequence what we apply to it. The object, at the time of the infliction of the injury, is to subdue the irritation of the surrounding parts, and to prevent the accession of general inflammation.

The internal treatment must be determined by the constitutional symptoms induced. If these participate with the symptoms of the local affection, which manifest increased excitement alone:—if the general symptoms are unequivocally such as arise from aug-

mented action, we must resort to the use of sedative and antiphlogistic measures, proportioned, as in all other cases, to the degree of morbid state.

But should the consequence of the injury be more severe; if, from sudden and inordinately increased excitement, exhaustion of the system should supervene to excess of action; if cold shivering should continue long, with tremor, weak pulse, and other indications of the diminution of vital energy, a different state of things presents itself to our consideration; in which, should we not always possess the ability to support the powers of life by anodynes and cordials; the principle of treatment as directed to those degrees of injury, where “action is alone increased,” will, in the example now in contemplation, most assuredly not apply. Antiphlogistic and depletory means would only reduce the remaining powers of life, the recovery of which presents to us both in this and in analogous cases the greatest difficulty that art or experience can overcome.

In this state of exhaustion, recourse must be had, without delay, to measures of a

moderately stimulant agency, directed both to the local injury and the general system. Tepid water with an addition of alcohol—warm essence of turpentine, followed by a dressing of warm digestive ointment, or warm cataplasms of bread and milk, are applications proper for the occasion; while opium should be administered internally, in a sufficient quantity to relieve pain; a cordial to support the depressed energy of the nervous system, and nourishment to maintain the strength. But moderation must be considered the golden rule. We must accurately measure the danger of suffering a sudden loss of vital power from temporary exhaustion, with the risk of incurring a dangerous re-action by immoderate excitation.

With an especial view to maintain this balance between the exhaustion that may suddenly and irretrievably sink the patient, and the violent re-action which may as certainly produce destructive inflammation; we must carefully attend to the state of the circulation and the action of the bowels. In an example of purely inflammatory character, it

will be highly necessary to keep the intestines open with brisk cathartics: while in the example of exhaustion, if purging be improper, yet it will be requisite to guard against undue accumulations, arising from the deficiency of a regular and healthy evacuation.

In every case of Burn or Scald, in which the nervous system suffers at the moment of the accident, by the sudden shock which has been mentioned to occasionally attend injuries of this nature; sometimes even those of a comparatively slight description; (such severe and dangerous commotion being, probably, influenced more by constitutional diathesis, or by age, than by the degree of injury, exclusively considered); in every instance of this kind we should lose no time in our endeavour to tranquillise the sufferer by administering such a dose of opium as will generally be found to alleviate nervous irritation and excessive pain; together with such cordial means of supporting the *vis vitæ*, as the symptoms of general disturbance may appear to demand, giving attention, at the same time, to the state of the chylopoetic functions.

Although, upon some occasions, in which there is a severe shock thus given to the nervous system, almost equivalent to the sudden destruction of the powers of life, we may yet have reason to apprehend the supervention of morbid excitement, which might threaten ultimate exhaustion, if not timely subdued; nevertheless, in this emergency, we must support the vital energies thus placed upon a balance of peculiar danger. We must endeavour to tranquillise the momentary perturbation of the sensorial faculty, by the internal administration of anodynes and cordials, with the most soothing external applications, and then return to the more especial consideration of the principle and means of managing the local injury, with its concomitant effects on the general system, so as to obviate the subsequent accession of inflammatory re-action, when we have recovered the patient from the sudden shock with which he was so violently impressed at the moment of sustaining the injury.

It should thus appear, that although the *principle* in the treatment of accidents from fire be simple, and the *modus agendi* of the

different means which have been successfully employed on similar occasions, be strictly referable to a common cause; yet the management of Burns and Scalds demands variety. It has been remarked by a high authority (Dr. Thomson,*) that “considerable diversities are required in the local treatment of sloughing Burns, according to the stage, degree, and extent of the injury which they occasion, the part or parts of the body which they occupy, and according to the effects which the remedies employed may already have produced.”

There is indeed no case of disease in which a variety of character arising from contingent circumstances, so peculiarly demands a correspondent diversity of treatment. Hence, the difficulty of forming a general rule, not liable to deviation from numerous exceptions; and hence the impossibility of deriving accurate conclusions from the statements of individual cases, when we consider how seldom they bear to each other that degree of similitude in all the circumstances connected with their treatment, which would be necessary

* See Lectures on Inflammation.

towards the establishment of a general indication of cure.

Although the observation of Dr. Thomson led him to believe, “ that the remedies which are usually applied for the first twelve or twenty hours after a sloughing Burn has been received, have much less influence in preventing fatal effects than has usually been imagined :” yet, surely, in the majority of accidents of this kind which come under our inspection, a great deal must depend upon the prompt and instantaneous employment of means, the beneficial or pernicious agency of which can only be established by the justness of the principle which directs their application at the time the injury is sustained.

I am, however, led to concur with Professor Thomson in the opinion, that it is “ a matter of little moment which remedy shall be first employed,” because the various means found beneficial in these cases, produce in my opinion their good effects by a common principle of action, rather than because “ fashion has often a considerable sway in determining the treatment to be employed in the first stages of these injuries ;” although I am well aware

that fashion seldom bears more arbitrary sway than over the concerns of medicine ;—concerns which involve the most important questions connected with the happiness of human nature.

But if, at the time of the infliction of a burn or scald, a refrigerant and sedative application immediately relieves pain, and by diminishing the existing inflammation prevents the most serious consequences—if when depression of strength ensues from an accident of great severity, a moderate stimulus procures almost instantaneous relief, and prevents a fatal exhaustion ; an acquaintance with the principle of treatment as directed to these opposite states of disease must be highly desirable ; while the knowledge that the several remedies recommended with success, act upon a common principle, must also be considered an acquisition of peculiar benefit, as hence we can greatly multiply our number of useful applications, and occasionally resort to several, if thus recognised as being both safe and efficacious, which may be within our immediate reach, when we cannot avail ourselves of others.

The lessons of experience ;—“ the sanctity acquired from usage ;”—the doctrines of the highest medical authorities, impress me with a deep conviction of the validity of the opinions advanced in the preceding pages. In brief review they are as follows :

First, When the injury from Burn or Scald is not severe, there only results topical inflammation, with, perhaps, slight vesication. The cuticle is not detached, and the means of diminishing heat and vascular action are fully sufficient to effect a perfect cure. Such means may consist of either warm or cold, aqueous or spirituous applications. I have, however, generally given a preference to spirits when so employed, as to guard against a stimulant effect.

Second, If the cuticle be detached, the sensation produced by severe cold, as well as by the stimulus of a spirituous application, cannot be borne without great pain. In these cases, the spirits may be diluted or applied in the manner suggested by Mr. Parkinson ; or such other means may be had recourse to as will produce a soothing and anodyne effect, namely, the essence of turpentine reduced

with olive oil;—carron oil,—Goulard's cerate, —tepid water; and if the injury has been so violent as to produce tremor, weakness, and cold shivering, with increased pain, from the contact of the common atmosphere, warm essence of turpentine may be applied, and the parts subsequently defended by plasters spread with any mild ointment; or warm emollient cataplasms may be deemed more congenial with comfort in particular cases.

Third, If the injury produces constitutional derangement, it must either be from increased excitement, or from exhaustion of vital energy by the previous excess of action. In the former case, a depletory and antiphlogistic regimen is indispensable. In the latter, a judicious plan of supporting the powers of life by cordials and appropriate nourishment must be required.

Fourth, in almost every case of great severity, the irritability of the sentient system will demand the interposition of anodynes to procure immediate relief. In order to this, a sufficient dose of opium must be administered auxiliary to the employment of sedative applications.

The opinions I have here submitted to the judgment of the reader, are not in unison with those expressed by the experienced author of the *Essay on Burns*, whose acquirements are of such an order as to make me fear the worst from a dangerous rule of practice ingeniously imposed. To use the words of Dr. Kentish, "I am of opinion the more ably his book is written, the more likely is he to perpetuate error, and to do mischief." Under this impression, I cannot take my leave of the reader without bringing under his review some further remarks which have been suggested to my mind from an attentive perusal of the *ESSAY ON BURNS*.

From the observations of Dr. Kentish, that "the most common and most decided effects of heat upon the system are to quicken the circulation of the blood, and increase the sensibility of the whole system," I should have expected a nearer coincidence with the conclusions I have formed and already stated upon the subject under discussion, than I could indeed have ventured to anticipate from the opinion quoted page 27, and from simi-

lar sentiments expressed in other parts of the Essay on Burns.

Increased circulation and augmented sensibility, are most assuredly the immediate consequences of the application of heat to the living body; but how is this view of the subject (in my opinion accurate) to be reconciled with what follows? “The *temperature* of the human body is in general about 98 degrees; but, to facilitate my explanation, we may suppose it at 100. The whole body being in perfect unison, *acting* at the rate of 100, an instantaneous application of boiling water, at 212° , is made to some part of the body; that part will be immediately excited to an increased *action*, which I shall suppose to be indicated by 150. In this state there will be a disparity of *action* between the part and the whole, equal to 50 degrees—the cure must consist in restoring a unity of action between the part and the remainder; if therefore I am enabled to excite the action of the general system up to 125° , the disparity of action will be immediately diminished by 25° . The indication in this case will there-

fore be to excite in the most sudden and rapid manner, the greatest possible action of the general system, compatible with life.— Thus large doses of ether, volatile alcali, ardent spirit, opium, wine, &c. given in hot water, are what should be administered in the first instance.”

I shall not, upon this occasion, think it necessary to examine strictly into the opinion which deduces from a defined measurement of animal *temperature* a correspondent degree of vital *action*. But let us, for a moment, acquiesce in the assumption that the application of 212° of *temperature*, when applied to some part of the body, raises the *action* of such part to 150° , while that of the rest of the system remains at the ordinary standard of 100° . Let us also suppose that we can raise the *action* of the whole system to 125 of these *imaginary* degrees, by the means proposed “to excite the greatest possible action of the general system, compatible with life;” nevertheless, I cannot perceive that we should benefit the sufferer by thus exciting the *natural* action of the *general* system to the greatest possible degree compatible with life, in order

to meet the morbidly increased action of a *part*. Adverting once more to the remark of Dr. Kentish, that “the most common effects of heat are a quickened circulation and increased sensibility of the whole system,” I must submit that the further view of this subject, exhibited by Dr. K., does not authorize the mode of treatment he has proposed, even admitting the theory of a disparity of action to be correct.

For the relation in which the injured part is placed, with respect to the general system, is explicitly this:—The topical action is increased by the direct stimulus of heat: in this effect the rest of the system participates: and such participation is evinced by the accelerated circulation and increased sensibility—by the state of the pulse, urine, tongue, &c. The indication is not to raise the action of the rest of the system to that of the part—not to excite fever in the whole body, because there is inflammation in a part—not to quicken the action of the heart, and all the arterial system, because a few vessels have been excited, but to reduce the local excitement to that of the general system, when the injury is so slight

as not to communicate its effects throughout; and if the system at large should participate, then both must be brought down to the measure of health.

Dr. Kentish “entertains no doubt that the train of symptoms which lead to a fatal termination, are the consequence of *debility*, from the exhaustion of the vital power by excess of action.” In this statement I perfectly concur. But the mode of treatment to obviate such *debility* will be that which diminishes in the speediest manner the morbid excess of action, justly considered as its cause.

The attempt to reproduce an imaginary unity of action, by raising the system (already morbidly excited by association with the injured part) still higher in the scale—even “to the greatest possible degree compatible with life,” in order to meet the topical excitement, to my mind presents a measure replete with practical danger, without the shadow of principle, or the most remote analogy to support it.

Dr. Kentish “apprehends that one of the greatest causes of delusion arises from attributing to various applications the power of

curing *slight* burns, many of which would have been cured without any application at all, and some perhaps much sooner than by the applications which were used." He therefore "endeavours to avoid this delusion by *only* bringing into comparison *very severe* cases, such as would terminate in the destruction or safety of the subject, according to the different modes of treatment."

This view of the subject demands attention. The *nature* of the injury from Burns and Scalds *within certain limits* of severity, (it has been noticed in the preceding pages), merely differs in *degree*. So long as the character of the morbid affection thus produced, is only marked by *difference in degree*, a mode of cure will be found universally appropriate to every such instance of injury, deduced from our acquaintance with a common principle, although the *particular* management may require to be varied conformably with the circumstances peculiar to *individual* cases.

But when the accident is so severe that it would "terminate in the destruction or safety of the subject, according to the different modes of treatment;" I must consider the

example as one which differs in *kind*; and which will demand a rule of management founded upon an *opposite* principle.

There are many examples of Burns and Scalds, which, although slight in degree, are yet sufficiently important to demand immediate professional aid; I should therefore wish to consider the principle of curing Burns and Scalds, by proceeding in a gradual series from the burning of a finger with sealing-wax, or from a scald inflicted by the upsetting of a cup of boiling water, to the severest accident: and from this comparison, assisted by the results of past experience, I would rest the views I entertain, both of the particular nature and treatment of injuries from fire.

Dr. Kentish commences at the opposite end of the scale. "Throw an animal (says he) into a furnace of melted glass, and he will be calcined in a few moments."—"Infinite are the shades of injury between this destructive degree, and that which merely excites a slight morbid action of the part affected; yet the agent which inflicts the injury is the same in both instances, namely, heat;" therefore, "the treatment which would draw the

individual back to perfect health, who had advanced the *furthest* on this scale of destruction, must undoubtedly be the *best*."

If, however, that important difference does subsist in the *nature* of the injury, which I have mentioned to arise from a difference in the degree of its infliction;—if the hurtful exciting cause produces *increased* vital action within certain degrees of its application to the living system, and sudden exhaustion from higher degrees;—if, as Dr. Kentish remarks, "the excessive stimulus of fire, and the irritative fever kept up from this stimulus, exhaust the system;"—it will not then follow, that the best remedy in the most severe example, must likewise be found the best in those cases that are not so far advanced on the scale of destruction; but it will follow, on the contrary, that as the state of the vital energy absolutely differs in the instance of a Burn or Scald, "where the action of parts is alone increased," and when an animal is thrown into a furnace of melted glass; so the treatment must be governed by these opposite states. I cannot therefore admit the following inference, "that to pro-

ceed upon the *same* principle in those *slighter* cases which would *not* affect existence, as in those *extreme* cases which *would*, must in a proportionate degree be beneficial."

When the actions of the system are alone increased in the case of a Burn or Scald, such increase will be unequivocally manifested by the symptoms of general disturbance already detailed; as will also those which take place from the debility consequent to excess of action. The means of restoration to health are as diametrically opposite as are the states of the system which demand relief. When the actions are morbidly increased, they must be as speedily as possible reduced to the measure of health by antiphlogistic measures. Where exhaustion has supervened from unsubdued excitement, the system must be supported by the moderate use of cordial medicine and a nourishing diet.

Dr. Kentish observes: "As the effects of caloric on the system are, first to produce increased action; and secondly, if carried to a greater extent, to destroy organization; it appears to me necessary to form the division of Burns upon this simple principle."

“ 1. Injuries from caloric, where the action of parts is alone increased.

“ 2. Injuries from caloric, where the action of parts is increased, and the organization of some other parts destroyed.

“ This easy division (Dr. K. continues) of injuries from such a source, will include every possible variety.” This conclusion I cannot admit—Experience points out to me an important deficiency in the above classification; for it does not provide for the state of “ debility, from the exhaustion of the vital power by excess of action;” neither does the indication of Dr. Kentish provide the means for subduing the “ fever kept up from the excessive stimulus of fire.” His arrangement, it is true, comprehends the state of morbid excitement; but this important discrepancy obtains between his theory and practice, that the treatment is expressly designed to excite still more the general actions of the system.

The second division in the classification referred to is merely nominal; for, as Dr. K. observes, “ to a disorganized part, as to an eschar, it is of no consequence what we apply:” here again, I must perfectly concur

with the Author of the Essay on Burns, but not so in the inference he draws. “As,” says Dr. K., “it is our duty to save the living parts, or those which have their action only increased, our mode of treatment must *always* be the same.”—Thus the state of *general* excitement (liable to terminate in debility from exhaustion by previous excess, unless subdued at the onset by judicious depletory means) is unnoticed in the curative indication. Increased action of the injured part, with augmented circulation and increase of sensibility, it is true, are fully recognized. But to what practical purpose? Most erroneously, as demanding those internal means which will “throw the heart and arteries into the most violent action compatible with life.”—But the exhausted state of the general system, the debility so accurately ascribed by Dr. Kentish to excess of action, has no mention in this division—“which nature and reason appear to sanction.” The increased action of some parts, with the chemical destruction of others, from the contact of disengaged caloric, are alone the objects presented to the view.

The practical rule of conduct, therefore, to

which I especially object, is that which overlooks the reduction of the *general* excitement—the producing cause of subsequent debility, and which proceeds upon the principle of establishing a unity of action by the administration of the most highly diffusible stimuli; whereas the proper indication would be to moderate the first excitement, which is itself the only cause of the mischief which supervenes, and which takes place throughout the system by sympathy with the injured part.

The next objection to be urged, is to the employment of the *most powerful* stimuli, in order to restore the strength when debility has *actually* followed excess of action. The debility in this case may be the consequence either of mismanagement or of neglect; or indeed it may ensue with a degree of rapidity beyond all control from the intensity of action of the hurtful exciting cause. From whatever circumstances the effect may have been produced, the means of restoration are, however, the same. The *vis vitæ*, both topical and general, must be supported by stimulants of moderate agency, whose precise amount can be only measured by its adapta-

tion to the existing degree of morbid depression. Pain must be alleviated by appropriate anodynes. The functions which require regulation (as for example those of the *chylopoetic viscera*) must receive especial attention; but inordinate excitation has here no place. The analogy which appears to me to subsist between the method of treating Burns by the application of powerful stimuli to raise the actions of the general system, and the principles of practice inculcated in the Brunonian Elements of Medicine, is singularly striking. The detail consists in proposing to remove the debility produced by the action of excessive stimulants, through the medium of excitants which arrange themselves the next in degree of power to those which occasioned the morbid state: “In the cure of indirect debility, whatever be its degree, from whatever sort of excessive stimulus it has arisen; of the stimulus which is to be employed as the chief remedy, not much less than that which produced the disease, should, at first, be used;”^{*} than which a more

^{*} The Elements of Medicine.

dangerous dogma has never been inserted on the records of medicine.

The practice *first* pursued by Dr. Kentish, was, most assuredly, inefficient. The antiphlogistic plan so pointedly disapproved, was by no means “duly observed.” “If,” says Dr. K., “the fever ran *high*, cooling purges, with nitre powders, and *decoctum anti-emetikum*, or some cooling febrifuge drinks,” comprehended “the general course pursued.” But these measures cannot be classed with the vigorous adoption of the antiphlogistic practice. The course pursued was worse than useless, from the trifling manner of its application.

The case of JOHN THOMPSON suggests these remarks.* He was severely burnt. Let us consider the leading symptoms, and the measures adopted for their removal. From a review of these circumstances, we shall be enabled to form a more accurate judgment of the merits of the charge preferred against both the safety and efficiency of the antiphlogistic plan of management; whether as this plan “was

* See Essay on Burns, page 61.

practised at the County Hospital of Newcastle-upon-Tyne," or as recommended by Heister, Van Swieten, and Sydenham, and others "the most orthodox in medicine and surgery."

The internal treatment.

On the First Day.—An emulsion and anodyne, with thirty drops of laudanum were given.

Second Day.—Pulse 100, "a dose of purging salts, and the anodyne repeated."

Third Day.—Ten drops of laudanum added to the anodyne—nitrous powders.

Fourth Day.—Pulse 120.—Urine very high coloured. Medicines as yesterday.

Fifth Day.—Pulse 120—Urine high coloured; no evacuation by the bowels since the operation of the purgative:—a purging enema, the nitrous powders, and anodyne, as before.

Sixth Day.—Pulse 130; the enema had procured a copious evacuation; the functions of the brain much disturbed—tongue parched—great thirst. Ordered saline julep and apple tea; the anodyne as before.

Seventh Day.—Pulse very quick, but not

so strong as yesterday ; the brain more affected, and he appeared in a comatose state :—had hickup and vomiting. Ordered a cordial julep and the anodyne.

Eighth Day.—Pulse very quick, small, and fluttering ; constant stupor. The same cordial medicine was directed to be continued, with the anodyne.

Ninth Day.—Early in the morning he expired.

Such were the symptoms, and such was the internal treatment directed to the removal of the general derangement of the system affected by a severe Burn.

The external applications, at first, were oil and plasters of wax and oil spread upon lawn paper. On the fourth day there was an appearance of a fresh inflammation upon the arms ; emollient cataplasms were then applied. The inflammation upon the arms became more extensive on the fifth day. On the eighth, the red colour of the inflamed parts had disappeared—“ the whole of the burnt surface was of a dirty brown ; the ash-coloured spots were of a blacker hue, resembling the

colour of a mortification excited by any other cause.”

The external applications were equally inefficient with the internal treatment. The case appears to have been of great severity, but from the detail of symptoms, was, most probably, within the range of inflammatory action. It affords no evidence on the use of refrigerant applications. Plasters of wax and oil spread upon lawn paper, could only keep up the morbid heat and action, by preventing evaporation. Upon what principle the emollient cataplasms can be classed with “*the strongest stimulants*,” and why under that view of their agency they were applied because of an “appearance of fresh inflammation,” I am at a loss to conceive.

If we bear in our remembrance the observation of Dr. Kentish, that in these cases the mortification arises from exhaustion produced by excess of action, and then recur to the leading symptoms and the means employed; can we feel surprise in perceiving the result? Dr. K. treated several other cases, and saw others similarly treated, in which, he observes, all had the same fatal termination.

I cannot, however, admit the treatment of this case to be “perfectly conformable both to the practice and opinions of the most orthodox in medicine and surgery.” The anti-phlogistic plan was not employed with an energy proportioned to the urgency of the occasion. This constitutes a momentous difference in the management, which accounts too obviously for those results that were so similar, both in their symptoms and in their fatal termination.

The practice of Heister, which was founded upon his opinion that a Burn or Scald presented an example of inflammation, varying in degree conformably with the degree of injury;——this practice, which Dr. Kentish considers “the most pernicious that could be had recourse to,” and which directs bleeding, and effective purgatives, a rigid diet, and cooling ptisans, was not resorted to in John Thompson’s case.

The practice of Van Swieten and Benjamin Bell resembled that of Heister. Van Swieten considered the “different degrees of the several effects from burning, to resemble those observed from the first and slightest

degree of an inflammation, till it degenerates into the worst, or most severe sphacelus."

—He was thence led to advise "bleeding, repeated according to the nature of the case, with antiphlogistic purges." Mr. B. Bell directs, "when Burns are so extensive as, by the irritation which they produce, to excite much inflammation and fever, blood-letting, purging, and the antiphlogistic regimen." This is a brief outline of the practice of the most "*orthodox* authorities," (to use the words of Dr. Kentish), who cannot be accused of having lost John Thompson by pursuing their routine.

The *most* efficient measures in the practice of those authorities, and which were derived from their opinion of the *nature* of the injury, were in John Thompson's case altogether unemployed. The fatal event appears to have resulted from the violent action productive of fever with cerebral inflammation, quickly terminating in exhaustion as indicated by *coma*, *singultus*, quick, small and fluttering pulse; and the mortification of the parts which had previously suffered by inflammation.

Bleeding, purging, a rigid diet and cooling ptisans were all deemed necessary by Heister to be employed in cases of Burn or Scald, conformably with the exigency of the inflammatory symptoms.—Now, what were the most striking symptoms in the case under review? The pulse was 100 from the first, and rose by the 6th day to 130—the urine high coloured—the bowels costive—the tongue parched—the thirst great, and there was cerebral derangement. On the day prior to the patient's decease, what description of change took place? The pulse became quick, small and fluttering—with hickup, vomiting, and coma. Such is the outline of symptoms. What was the treatment adopted to counteract them, and stated to be “conformable both to the practice and opinions of the most orthodox in medicine and surgery?” It was in brief detail as follows:—An anodyne every evening—a dose of purging salts on the second day—powders, with the nitrate of potash, from the third day; a purging enema on the fifth day, a saline julep, and apple tea in addition, on the sixth day—a cordial julep on the seventh day—which was continued on

the eighth,—and on the morning of the ninth day, he died. Can it, with any propriety, be said of this practice, that it was antiphlogistic, and “consonant to the direction of every medical writer from the earliest to the present period?”

From the preceding detail, I am of opinion that, the “sudden disappearance of the redness and swelling, and likewise, the ash-coloured spots becoming more livid or blackish;—the hickup, vomiting, and subsequent coma,” were referrible to exhaustion from *previous* inordinate and *unsubdued* excitement.

To enable us to judge of the real value of the refrigerant and antiphlogistic treatment, examples should be adduced in which that treatment was pursued upon the proper occasions only, and to the extent recommended by the authorities whose principles and practice Dr. Kentish condemns. Has Dr. Kentish given any case of severe Burn, in which the depletory and antiphlogistic treatment was fairly put to the test? If, in the cases of severe Burn, which have already passed from inflammation to exhaustion, bleeding, purging and low diet are resorted to, the practice

is radically wrong. Or if, in the cases which demand the depletory treatment to subdue inordinate excitement, the most feeble measures only are adopted—the patient will, most probably, be lost; but the fatal results under these circumstances offer no argument against the propriety of the decisive practice recommended by Heister and the other authorities adverted to above.

I shall, however, leave all further commentary on John Thompson's case to the reader, whose attention I solicit to a careful perusal of the Essay on Burns; from which both the above and following cases are transcribed, in order that he may the more correctly appreciate the practice there enjoined.

The next case I shall refer to, is that of John Clark,* in which Dr. Kentish was “determined to alter his treatment, and proceed upon different principles.”

First Day.—Sixty drops of laudanum and an ounce of camphorated tincture of opium in a pint of the oily emulsion—two grains of opium at night.

* See Essay on Burns, page 71.

Second Day.—He passed a very restless night, and had suffered very severe pain, notwithstanding the quantity of opium he had taken: pulse 100. To take a drachm of bark, with half an ounce of the compound tincture, and ten drops of tincture of opium, every two hours, in a cordial draught: and an anodyne at night, with sixty drops of tincture of opium.

The food was ordered to be plentiful and nutritive, with port wine negus for common drink.

Third Day.—Restless and uneasy since the report of yesterday: the medicines were continued: in addition to which a cordial anodyne, with sixty drops of tincture of opium, was ordered to be given in the morning; “the bowels being confined, probably by the quantity of opium, a powerful cathartic enema was ordered.”

Fourth Day.—Pulse 110, full and strong; the enema had procured a free evacuation.

Fifth Day.—The medicines continued as before.

Sixth Day.—Pulse 120—No evacuation by the bowels had taken place since the last

enema, which was ordered again to be exhibited: a dose of calomel and aloes was given at night, and the other medicines and diet continued.

Seventh Day.—He had found relief from the enema; the pills were to be repeated at night. He had hitherto taken his generous diet, and his cordial medicines, with anodynes, cheerfully; he was therefore ordered to continue them.

Eighth Day.—His pills had produced an evacuation; twenty drops of ether were added to each dose of the bark and laudanum; and half a drachm to the morning and evening anodyne.

Ninth Day.—Pulse 120; the urine highly colored; the stomach still performed its office. Continued the same medicines and diet.

Tenth Day.—“Some small vesicles had appeared upon the eschars in the axilla, which, when punctured, emitted nothing but gas; that symptom, so general in mortifications taking place in different parts of the body from any other cause, convinced me that I was right in the opinion I had formed as to the termination in such cases;”——the in-

flammation still continued. The bowels had not been moved: he had, therefore, the purgative pills.

Eleventh Day.—Pulse 135; had vomiting and frequent hickups; as much wine as he would take was ordered him: had considerable stupor.

Twelfth Day.—Pulse very quick, small and unsteady; had remained in a comatose state since the last report. He continued in this state until the evening, when he ceased to breathe.

“The result of this case was calculated (says Dr. Kentish) to make a strong impression upon my mind, though it did not terminate favourably; yet, the treatment having prolonged existence, and retarded the unfavourable symptoms, I was induced to think myself in the right direction.”——

“As this practice was so diametrically opposite to the positive directions of every medical author, both ancient and modern, whose works I had consulted, to find it likely to succeed was a source of no small gratification, and a strong incitement to persevere in the same train, to establish the fact.”

To the above observations I shall subjoin but few words. As in Thompson's case, so here likewise, I shall leave the reader to form his own conclusions.

This case appears to have been less severe than Thompson's, as the legs and feet escaped injury. Thompson died on the ninth day; Clark not until the twelfth. The treatment of Clark was upon "the new plan," from the beginning; notwithstanding which, the prominent symptoms very much resembled those in Thompson's case. Frequent pulse;—from 100 it gradually rose to 110 on the fourth day—120 on the 6th—135 on the 11th. The urine highly colored—bowels costive. There was latterly vomiting—hiccups—stupor. The plan of treatment in this case of John Clark, is said to have "succeeded to a certain extent;"—"it carried my patient," says Dr. Kentish, "*considerably beyond* what I had hitherto regarded as a fatal period." Dr. K. therefore considered himself upon this occasion "in the right direction,"—"the treatment having prolonged existence, and retarded the unfavourable symptoms;"—that is, John Clark lived *three* days longer than

Thompson! But it is impossible to say whether the treatment prolonged or shortened existence. We have not sufficient means to ascertain if these cases were parallel in essential circumstances, or widely opposite in important particulars. If it be attempted to draw conclusions from comparing the effects of different methods of treating Burns and Scalds; it will first be necessary that the examples adduced should exactly resemble each other.

Dr. Kentish is correct in stating "this practice as diametrically opposite to the positive directions of every medical author, both ancient and modern."——I wish he could have stated it to have been more beneficial to his patient. The exhibition of purgatives was judicious, and probably did much towards arresting the more rapid advance to a state of exhaustion, which appears to have resulted, as in the former case, from inordinate and unsubdued excitement.

I shall next notice the case of Thomas Johnson, in which Dr. Kentish observes, he "vigorously pursued the internal stimulant plan."

First Day.—A cordial draught was immediately given, with fifty drops of laudanum, to be repeated at night; a cordial volatile julep, with peppermint water, to be taken during the day: and the diet was allowed to be as good as he could take; with strong port wine negus for common drink.

Second Day.—Had passed a very restless night; the opiates and cordial, with the generous diet, were continued.

Third Day.—Pulse 110; had no evacuation by the bowels since the accident; five grains of calomel were given at night; the other medicines were repeated as before.

Fourth Day.—Half a drachm of Peruvian bark, in one ounce and a half of the decoction, with half an ounce of the compound tincture of bark, was given every three hours; the night and morning anodynes continued; the diet as before.

Fifth Day.—Pulse 120; urine high colored: medicines and applications as before.

Sixth Day.—No variation.

Seventh Day.—Medicines and diet continued.

Eighth Day.—The bowels not having been

relieved since the calomel powder, it was repeated. Medicines and diet as before.

It was above a twelvemonth, Dr. Kentish remarks, before this case was cured. But it was cured “in defiance of the directions of every medical writer, from the earliest to the present period.” Hence was laid the foundation for a *general* rule of practice in Burns and Scalds, to which my experience will not permit me to subscribe. I must dissent from a theory which extends its rule (in the treatment of Burns and Scalds at the period of their infliction, “where the action of parts is alone increased,”) from those cases, which are of the very utmost severity, to such as are comparatively slight, upon the principle that “the treatment which would draw the individual back to perfect health who had advanced the furthest on the scale of destruction, must (likewise) be the best” in every *lesser* degree of morbid affection produced by the same cause.

For I must once more repeat that a difference in the *degree* of injury sustained, at length may amount to difference in *kind*. And thus I must contend against the adoption of an

universally excitative plan of treatment; because such a plan can no more obtain to the welfare of the sufferer in those cases in which the actions are alone increased, than it can in those of a severer character where debility is the result of previous excitement. The indication in the first example is, to subdue excess of action by depletory general measures, and by refrigerant local applications: in the second, to support the exhausted system by the exhibition of moderate, *not powerful* stimuli.

One omission renders the three cases adverted to above less valuable as evidence than they would otherwise have been. There is no mention made of the natural constitution or temperament of these three men, or their state of health previous to, or at the time of the infliction of the injury. If we suppose that Thomas Johnson was a man of strong constitution, and John Clark, on the other hand, a man of weakly habit, we may account by this difference only, for the difference in the issue of the two cases.—“If, (says Dr. Ken-
tish,) where two patients are so severely burnt as to destroy life, the existence of the one can be continued some days longer than

the other, by a different treatment, it is natural to conclude, that the mode which preserved life the longest is the best." I must again remark, before such a conclusion can be correctly drawn, the principal circumstances of the two cases should exactly resemble each other.

Having thus far given the reader the opinion I have formed from an extensive experience in Burns and Scalds, with respect to the *principle* of treatment, at the time of their infliction, it must rest with him to draw his own conclusion upon the successful issue of Johnson's case.

An extended review of this subject, which shall at the same time embrace a retrospect of some of the leading circumstances deserving particular consideration, will serve to establish still further the conclusion already expressed on the title-page of the present remarks. In these, the experience of "*the most orthodox in medicine and surgery*" has been asserted; while the opinion "*diametrically opposite to the positive directions of every medical author, both ancient and modern,*" has been shown to be formed upon an hypothesis,

which cannot tend “*to rescue the healing art from empiricism, and reduce it to established laws;*” but must lead to the adoption of an erroneous practice founded on the *dicta* of a mistaken theory.

FIRST—With regard to the principle which directs the external treatment, together with the remedy so exclusively employed—
THE ESSENTIAL OIL OF TURPENTINE.

To whatever extent the test of experience may justly advocate the occasional value of this application to Burns, there is neither novelty in its employment, peculiarity in its remedial action, nor exclusive benefit from its use.

To examine no other evidence than that in the Essay on Burns, it is there manifest that the use of spirits of wine and oil of turpentine was familiar to Heister and the older surgeons; while among the moderns, Mr. Badley, the able correspondent of Dr. Kentish, testifies that “the practice was not quite so new to him, from the circumstance of his father having been led to select the oil of turpentine as an external application, which for many years he was in the habit of using very freely.” Mr. Badley “had reason to believe that se-

veral surgeons, in different parts of the kingdom, were in the habit of using the oil of turpentine as a dressing in Burns." There is nothing *peculiar* in the remedial character of oil of turpentine as an application to Burns, "where the action of parts is alone increased." Its curative properties resemble those of other means recommended in the preceding pages. It differs from them only, in as much as its beneficial agency is more limited.

"The evaporation of the essence of turpentine, (Dr. Kentish observes) is considerably less than that of ether and alcohol." — "As cold to the surface *always* does harm in Burns, essence of turpentine will be the most eligible, as producing that in the smallest degree."

The circumstance which recommends the oil of turpentine so universally to Dr. Kentish, forms with me its principal objection; especially in those cases "where there is increased action alone." The objection is not formed from any idea that the oil of turpentine possesses, in such cases, a positively injurious property: I am well aware it differs

in no essential respect from many other applications; but it is less efficient from being a less perfect conductor of caloric. The measure of its efficacy is proportioned to its power of reducing morbid heat by evaporation. Inasmuch as it effects this salutary purpose, the oil of turpentine possesses a virtue which certainly entitles it “to rank (according to Dr. Kentish) in the Class Torpentia, or amongst those applications which lessen action.”

But when it is desirable to lessen action in Burns and Scalds, the more perfect conductors of heat are greatly to be preferred: and much experience tells me that when the oil of turpentine is more particularly beneficial as a dressing in these accidents, it is in that variety of injury where exhaustion has supervened to excessive action—and not where the excess of action continues. It would, therefore, be not beneficial according to the *theory* of Dr. Kentish, although I have no doubt he found it so in his *practice*—to the full extent of his statement. In the employment, therefore, of oil of turpentine to Burns and Scalds, “where the action of parts is

alone increased”—and where the cuticle is not detached; the scale of its efficacy is determined by its power of reducing morbid heat. Inasmuch as it is a less perfect conductor of caloric than ether, alcohol, or a variety of cold applications: insomuch will it be found less useful.

When the cuticle is detached from a considerable surface, while “the action of parts is alone increased,”—the application of undiluted oil of turpentine sometimes occasions violent pain. When this has occurred from using it hot or cold, I have seen the pain lessened by employing it merely tepid; or by mixing it with a bland oil, so as to diminish the stimulus of its action, “and prevent its giving insufferable pain.”

But when the injury is so severe as to have exhausted the *vis vitæ*;—when moderate stimulants are required to raise the system from a state of debility occasioned by the previous inordinate excitement; the oil of turpentine *then* becomes a useful application; it presents a valuable medium between the extremes of stimulant and sedative agency; either of which effects may be produced by the parti-

cular manner of conducting its employment. If it be desirable to procure its sedative effects by diminishing heat and increased action, evaporation should be favoured as much as possible; if, on the contrary, a moderate stimulus is required, its evaporation should be obviated by excluding the atmospheric air.

The beneficial effects of the oil of turpentine as a dressing in Burns and Scalds, are not alone determined by its appropriate application to particular classes of these injuries as distinguished by their respective degrees of topical severity abstractedly considered: but are also governed by those collateral circumstances which establish the character of each case;—such as age, sex, habits, temperament, &c.; nor can any just inference be drawn from comparative trials of this or any other means employed in Burns and Scalds, unless the examples adduced in proof are strictly parallel in all essential respects.

My chief objection upon this point, is to the *principle* by which Dr. Kentish directs us to the employment of the terebinthinate dressing. This principle (already adverted

to in the preceding pages) is formed from an assumed analogy between the treatment of Frost-bite and Burn: leading to the conclusion that it must be unsafe suddenly to diminish the morbid heat in Burn, because it is dangerous to communicate the same powerful agent, suddenly, in Frost-bite——“Hence,” says Dr. K. “oil of turpentine will be the most eligible, as producing cold in the smallest degree.” The error contained in this inference is, therefore, the chief cause of my anxiety to expose the fallacious reasoning from which it is drawn;—for it would deprive us of the aid of many useful remedies, which act upon a common principle with the oil of turpentine, are sometimes of superior efficacy, and, what is of great importance, are at hand when the oil of turpentine is not.

It will be seen that the objection just urged to the *theory* of the *modus agendi* of oil of turpentine, as a dressing to Burns and Scalds, equally subverts the *practice*, which prescribes it with a universality exclusive of other efficient applications; for while, on the one hand, it has been repeatedly ascertained,

that the turpentine sometimes gives great pain, is occasionally productive of little benefit, although found efficacious in the Burns which Mr. Badley adverts to—"chiefly of the sloughing kind;"—yet, on the other hand, if we consider the testimony adduced in the preceding pages of the unequivocal benefit derived from cold applications; and extend our view to the examples recorded in the Essay on Burns, "to point out to us the *danger* of attempting to cure Burns and Scalds by the application of cold;" we shall, I think, from a due comparison of all the evidence, arrive at a conclusion upon which to rest our final judgment with respect to the relative value of different external applications, and this by no means in favour of the oil of turpentine to the exclusion of other means.

In addition, therefore, to my personal experience, and the collateral proof afforded by the further testimony quoted from numerous respectable authorities, (page 38,) of the decided advantage of cold applications to Burns and Scalds, I shall next briefly recapitulate the result of the same practice as we find the

account of it detailed in the cases referred to by Dr. Kentish in the Essay on Burns, whose object is the very reverse of mine.

FIRST—In the case transcribed from Richerand, cold water was applied; but perhaps the reader will concur in the opinion, that as “the *entire* surface of the body was *roasted*, from the head to the feet,” such case must have been hopeless under *any* treatment.

SECOND—Miss Phillips was relieved by cold applications within three hours.

THIRD—Mr. Emasle’s case was expressly adduced in *La Médecine éclairée par les sciences physiques*, to show “that the mere renewal of cold water is one of the *most precious* means we are acquainted with;” for, “on the evening of the same day, the patient walked about without suffering any pain.”

FOURTH—Mr. Didier informs us (in the same work) that “a young man whose clothes took fire threw himself into a large vessel, where he made them pour several pails of water upon him to extinguish the flames; he was burnt from the knee to the ankle of each leg.”—Such appears to have been the good effect of the application of cold water, that

“ he had no other desire than to remain immersed in the water, and wished to increase its efficacy by adding ice.” Dr. Kentish justly remarks, the cold water “ was resorted to in order to prevent the injury, (to extinguish the flames) but not to remedy the effects.” Yet should it appear to have been very efficacious, or the patient would scarcely have expressed the desire to remain immersed in it, and to increase its efficacy by adding ice.

FIFTH—The cases quoted in the Essay on Burns from Sir James Earle, present us with evidence that is unquestionable in itself, and favourable to the opinion entertained of the efficacy of cold applications. In the *first* it is stated that “ cold water being found to give ease, was constantly renewed.” In the next case “ ice was applied, which, appearing to give *immediate* ease, was continued.”

The *third* case was that of Sir James Earle’s child: “ ice was applied, and he got *immediate* ease; but as soon as the ice was melted, which was at first in a short time, the pain returned, and he cried out for more.”

The *fourth* case was of great severity,

“ nearly half the body was scorched, and there was one continued burn, which made a surface by measurement of more than four hundred inches.”—“ The burnt parts were covered as soon as possible with powdered ice and ice water, from which she found *immediate* ease.

The *fifth* case cited from Sir James Earle, is that of a young lady, and related by herself. Speaking of the application of ice by the directions of Sir Walter Farquhar, she observes, “ I soon experienced the benefit of this mode of treatment.”—Considering how much I was burnt, the pain I suffered was comparatively trifling, which I was persuaded was entirely owing to the application of the ice.”—“ My mother, who also used the ice to her hands, was cured in a few days.”

Sixth, In the case related by Mr. Anderson, although he had “ found stimulants act like a charm in superficial cases of Burns,” and applied the *oleum terebinthinæ* with great benefit to the lady’s face: yet it does not appear that she solicited the same application to her arm; for “ she said that her arm was *so much*

relieved by the water, and it had succeeded *so well* in a former accident, that she wished to continue it."

These are the cases related in the Essay on Burns in which cold applications were used. These, however, in addition to the evidence of the several other authorities cited page 38, and the result of considerable experience, afford to my mind so strong a proof both of the safety and efficacy of cold applications to Burns and Scalds, "where the action of parts is alone increased," as to oblige me to give the refrigerant plan of external treatment my fullest assent, and therefore to recommend it to the consideration of the reader as peculiarly deserving his attention.

SECOND—The *theory* of the *external* treatment of Burns and Scalds to be employed at the time of their infliction, "where the action of parts is alone increased," we have perceived to be formed, in the Essay on Burns, from a consideration arising out of an assumed analogy between the states of Burn and Frost-bite, (page 18). The *principle* which directs

the *internal* treatment of the same class of injuries, together with the means recommended to be employed, remains to be considered.

As the injured part in Burns (within certain limits) presents a state of increased action, Dr. Kentish assumes that a disparity subsists between what he terms the general action of the system and that of the injured part; and that as the action of the part is morbidly increased, it must continue to be excited; it must not be rapidly, but, on the contrary, very gradually lowered, while the natural healthy actions of the general system must be excited in such degree as will overcome the disparity, by raising the general action of the system to the morbid excess of action in the injured part.

The plan of carrying this into full effect was described page 25, when it was also stated, that the constitutional symptoms arising in consequence of Burns and Scalds, did not evince the disparity of action upon which has been founded the *internal* stimulant treatment; but that, on the contrary, they arose from the sympathy of the whole system with the injured part: the symptoms being

those of general inflammation when the action of the parts is alone increased, those of exhaustion, when the injury has been more extensive or severe; a difference in the *degree* of injury sustained, amounting at length to a difference in *kind*, inasmuch as to demand an *opposite* plan of treatment. The cases cited in the Essay on Burns to show that the *internal* antiphlogistic treatment “is the most pernicious that could be had recourse to, and that a mode diametrically opposite should be pursued,” are as follows :

FIRST, The case from Richerand, in which the patient fell a victim to the dreadful extent of injury from the large surface burnt; it was, perhaps, as I have said before, hopeless under any treatment.

SECOND, The case of Miss Phillips, which I particularly lament, because I think much is to be ascribed to the *neglect* of antiphlogistic measures, a part of which was “an irretrievable indifference to the state of the stomach and bowels.”

THIRD, In the case of Boerhaave, it is said, that (after bleeding and purging) “by the use of a thin diet, and plentiful drinking

of cooling liquors, the cure of this *dangerous* Scald was so *happily* advanced, that in eight or nine days' time he appeared again in public."—It is quite impossible to arrive at any accurate inference from comparing this case with others, without a more perfect knowledge of several particulars than we possess.

FOURTH, The propriety of bleeding in Mr. Didier's case, could only be determined from a consideration of the constitutional symptoms induced by the injury : but of these we are not sufficiently informed to authorize any opinion. The patient however recovered.

FIFTH, In the case related by Mr. Reyne, there was (he says) reason "to fear the vital action of the part was destroyed." The accident was terrible : "she suffered the most excruciating torments." Without a more perfect knowledge of the general symptoms induced, it were impossible in this case also to judge of the propriety of bleeding : perhaps it was injudicious, for I apprehend a state of exhaustion had rapidly followed the infliction of so severe an injury, one of the effects of which is stated to have been "a general

leucophlegmatic habit with a tendency to ascites." The patient was, however, cured.

SIXTH, The last case adduced in the Essay on Burns, to show the pernicious effects of the antiphlogistic practice, is that of John Thompson, to which I formerly referred, (page 72,) in order to evince that " what was termed the antiphlogistic plan, was NOT duly observed." I must, indeed, remark, that so far was the treatment of this fatal case chargeable with the errors ascribed to the adoption of a vigorous antiphlogistic plan of management, that it was, in the main, even more stimulant than the treatment of other cases, said to be expressly conducted upon the *New Principle*. This, however strange, will be seen by the general outline of the stimulant practice pursued by Dr. Kentish, " when the theory was firmly established in his mind," and which I purpose to bring before the reader in the conclusion of the present view.

I think it proper, however, to repeat here, that in Thompson's case, (which was of great severity), the pulse rose from 100 to 130; the urine was highly colored; the bowels con-

fined from the third to the fifth day; on the sixth day he was delirious, with great thirst and parched tongue; a comatose state next ensued, with sickness and vomiting. The burnt surface was of a dirty brown, and the ash-colored spots were of a blacker hue.

The external applications were oil and plasters of yellow wax and oil spread upon lawn paper. Bleeding was not employed. The purgative exhibition was confined to one dose of salts and an enema. During four days nitrous powders were given. On the seventh and eighth, a cordial julep. Forty drops of laudanum from the second night throughout, and thirty drops on the preceding evenings.

Can this be called the refrigerant and antiphlogistic plan, in the acceptation of the terms implied in the directions of the “most orthodox in Medicine and Surgery,” whose practice, in this case, (Dr. Kentish remarks,) “was duly observed?”

This was the treatment Dr. Kentish first pursued. It was practised at the county hospital of Newcastle-upon-Tyne, and is regarded as the antiphlogistic plan of Van Swieten, “as perfectly conformable both to

the practice and opinions of the most orthodox in Medicine and Surgery.” “The ancients (continues Dr. K.) regarded a burn as an inflammation; to reduce which, they recommended bleeding, purging, and a low diet.”

The reader then perceives to what extent this practice was pursued in Thompson's case. He died on the ninth morning. Dr. K. “treated several cases, and saw others similarly treated; but they all had the same fatal termination.” This was, I grant, a sufficient motive for changing the practice, “for inducing me, (says Dr. K.,) to undertake the investigation, by which I have been led to lay down *principles* for the treatment of *all* such cases *in future* ;” for, “the success of the second mode of treatment, (in John Clarke's case, page 80,) showed me the errors of *all* systematic writers on this subject, up to the time I first wrote my Essay, in 1797.”—“When I had accumulated facts, I wished to account for the result: thus the practice led to the theory, and the theory subsequently unfolded to me *principles* which again further improved the practice.”—Thus armed, Dr.

K. advanced to the adoption of a practice “diametrically opposite to the positive directions of every medical author, both ancient and modern ;” for, “when the treatment pursued was antiphlogistic, and consonant to the directions of every medical writer, from the earliest to the present period, (as in Thompson’s case,) the patient died on the eighth day.”—The reader must determine, from the preceding view, if the above conclusions of Dr. K. are authorized on the test of experience and evidence of facts, with respect to the pernicious or beneficial agency of the refrigerant external, and antiphlogistic internal, plans of treatment in those cases of Burns and Scalds, “where the action of parts is alone increased ;” while I shall, in the next place, lay before him the plan of carrying into effect the *stimulant internal* treatment, for curing the same class of injuries, agreeably to the doctrine laid down in the Essay on Burns.

The rule of this practice has been already transcribed, but shall be now repeated. It is “to throw the heart and arteries into the most violent action compatible with life.”

I must here digress so far as to refer the reader to the principle I have laid down in the preceding pages, as applicable in practice to the varying degrees in which Burns and Scalds occur, producing their different effects agreeably to the degree and extent of injury, combined with the circumstances of age, sex, constitution, temperament, &c.

1. Where increased action alone results, the local means should be refrigerant and sedative; the general measures strictly and efficiently antiphlogistic.

2. If from the inordinate operation of the hurtful cause, exhaustion has succeeded to previous excess of action, both the topical and general treatment must be moderately stimulant: and,

3. If there occur a severe and sudden shock to the nervous system, independently, as it were, of the injury abstractedly considered; opium must be administered to allay the temporary perturbation of the sensorial faculty.

In order to point out with more accuracy the extent to which Dr. Kentish carried his rule of practice adverted to above, it will be sufficient to adduce the evidence he gives by

referring to the cases which are quoted from his own experience.

The first is that of JOHN CLARK.

First Day.—Sixty drops of laudanum—a pint of oily emulsion with an ounce of camphorated tincture of opium—two grains of opium at night.

Second Day.—A drachm of bark, with half an ounce of the compound tincture, and ten drops of tincture of opium, every two hours, in a cordial draught: and an anodyne at night, with sixty drops of tincture of opium. He was allowed gruel, with ale, for breakfast and supper, strong broths for dinner, and port wine negus for common drink.

Third Day.—The medicines as yesterday; in addition to which, a cordial anodyne, with sixty drops of tincture of opium, was ordered to be given, in the morning a cathartic enema.

Fourth Day.—Continue.

Fifth Day.—Continue.

Sixth Day.—The enema—a dose of calomel and aloes—the other medicines and diet continued.

Seventh Day—The pills to be repeated—the other medicines and diet continued.

Eighth Day—Twenty drops of ether were added to each dose of the bark, and half a drachm to the morning and evening anodyne.

Ninth Day—Continued the same medicine and diet.

Tenth Day—The purgative pills—He was averse to his food and medicines.

Eleventh Day—Rejected his medicine twice, and his food once; as much wine as he would take was ordered him.

Twelfth Day—Continued until the evening, when he ceased to breathe.

In this case the stimulant plan of treatment was fully employed—but perhaps, the effect was somewhat diminished by the pretty frequent use of purgatives.

The second case is that of THOMAS JOHNSON.

First Day—A cordial draught with fifty drops of laudanum—to be repeated at night; a cordial volatile julep, with peppermint water, to be taken during the day: the diet was allowed to be as good as he could take;

with strong port wine negus for common drink.

Second Day—The opiates and cordial, with the generous diet, were continued.

Third Day—A powerful cathartic enema—five grains of calomel at night; the other medicines as before.

Fourth Day—Half a drachm of Peruvian bark, in an ounce and a half of the decoction, with half an ounce of compound tincture of bark, was given every three hours; the night and morning anodynes continued; the diet as before.

Fifth Day—Medicines as before.

Sixth Day—Continue.

Seventh Day—Medicines and diet continued.

Eighth Day—The calomel repeated. Medicine and diet as before.

Thomas Johnson recovered, but it was a twelvemonth before he was perfectly cured. These were severe cases. In Johnson's the stimulant plan does not appear to have been carried to the extent it was in Clarke's case.

They both seem to have required an ano-

dyne and moderately stimulant plan of treatment.

If we were informed of the usual habits of living of these two patients, both of whom were young colliers; it might possibly appear that the medical means which in ordinary cases would be highly excitative, were here productive of a very moderately stimulant agency. This suggestion receives support from the account given by Dr. Kentish in general terms, of the facility with which his patients took their full diet, and cordial medicines. “A generous diet is congenial to their habits; they live well, when well; and they think that what does them good in health, cannot do them harm when they are ill, if they have the inclination to take it, and the ability to get it.” Considering therefore the probable influence of this disposition upon the constitutions of Clarke, and Johnson, a sufficient ground was afforded for the employment of a larger measure of stimulants and anodynes, than could be allowed in the occurrence of analogous accidents to persons of more temperate habits; but the liberal use

of stimulants rendered thus necessary by the peculiar nature of any individual case,—cannot be safely extended as a general rule: it presents no proof of a nature to induce us to endeavour upon similar occasions of injury from fire “to throw the heart and arteries into the most violent actions compatible with life.”

The means which succeeded in several severe cases, mentioned by Dr. Kentish, did so, in all likelihood, because they were applied to constitutions habituated to a great allowance of malt liquor, and often of spirituous drinks, in whom these medicinal stimulants might be given, not only without risk, but with benefit, because they would in these cases produce an excitation far feebler than that enforced by the terms of the theory proposed.

In Clarke’s case, however, there is much reason to think the stimulus was carried to an injurious extent: for the general symptoms were such as to bespeak inordinate excitement.

The following cases are adduced by Dr. Kentish to illustrate his own principles fur-

ther, and to enable another practitioner to apply them. They are here adverted to, in order to show that notwithstanding the internal stimulant practice failed when (as in the case of Clarke) it was pushed to the extreme, agreeably to the theory—that it yet appears to have succeeded when only employed within the limits of moderation. The difference in the treatment is apparent, on the most cursory comparison between the foregoing cases and those which follow.

1st Case.—JAMES JACKSON.

First Day.—A cordial draught with fifty drops of laudanum was instantly given; a pint of oily emulsion, with an ounce of camphorated tincture of opium, a tea-cup full was exhibited every three hours; also a bolus, with two grains of opium at night. Diet generous—negus for drink.

Second Day.—A pint of the decoction of cinchona with two ounces of compound tincture of bark, a tea-cup full every two hours. The opiate bolus repeated, with the addition of five grains of calomel—the diet continued.

Third Day.—Medicines continued, except the calomel.

Fourth Day.—Continued medicines and diet.

Fifth Day.—Medicines as before.

Sixth Day.—Continued the same means.

Seventh Day.—Continued.

Eighth Day.—The tincture of bark omitted, and the anodyne lessened. Negus and ale prohibited.

In this severe case, attended with all the symptoms which Dr. Kentish had before observed, “to indicate a violent shock to the general system”—the stimulants and anodynes advised were very moderate—they were not employed to the extent calculated “to raise the action of the heart to the greatest possible degree compatible with life,” but merely (with a sufficiency) to support the exhausted system.

2d Case.—MR. GLYNN.

First Day.—A large opiate in a cordial draught; a cordial mixture with a large proportion of compound tincture of opium. In the evening another large dose of tincture of opium, with orders to continue the anodyne mixture during the night, and to drink plentifully of strong negus, if thirsty.

Second Day.—Two ounces of decoction of

bark, with ten grains of aromatic confection every three hours ; thirty drops of tincture of opium at night ; the negus to drink, and any food his stomach should feel an inclination to take.

Third Day.—The medicines and diet continued.

Fourth Day.—Medicines and diet as before.

Fifth Day.—The same medicines ; also five grains of calomel at night.

Sixth Day.—The negus omitted—a little boiled meat once a day : the cinchona without cordial confection ;—opiate at night continued.

From the sixth to the twelfth day, spare diet, toast and water ; the anodyne omitted.

This was a dreadful case, “Never,” says Dr. Kentish, “had I seen a human being in such exquisite torture.”—Surely the means used, however judicious, were not such “as would quicken the circulation to the greatest possible pitch compatible with life.”

3d Case.—THOMAS SMITH.

First Day.—A cordial draught with sixty drops of tincture of opium ;—a cordial mix-

ture with compound tincture of opium; strong negus for his drink, and to eat any thing he wished.

Second Day.—The cordial mixture and anodyne were repeated, and the same generous diet was continued.

Third Day.—The cordial anodyne mixture, and the anodyne at night, were desisted from; the negus was omitted, and a more spare diet ordered: the bowels being confined, a bolus with five grains of calomel were given at night.

Fourth, Fifth, and Sixth Days.—A dose of cinchona in powder twice a day.

This was likewise a severe case, “He was dancing about the room from extreme torture; and when he stood still to speak, his teeth chattered in his head.”

4th Case.—MR. HOPPER.

First Day.—Sixty drops of tincture of opium in a bumper of brandy.—No further mention of any medicine, except on the fifth day, when an ounce of sulphate of magnesia was given.

“The three last cases related, (Dr. Kentish remarks) and treated upon principles so di-

rectly opposite, (to the orthodox practice) terminating so very successfully, fully illustrate the practical utility, as much as the theory does the justice of the philosophical principle!"—But so far from the theory being "legitimately deduced from the success of the practice;"—can any thing be more evident than that the *successful* cases were treated by *moderate* anodynes and stimulants, employed for a very short period, while the case of Clark, which *was* managed with more exact conformity to the rule laid down, terminated fatally?

I do not intend to imply that any just comparison can be made between the different results from different modes of treatment, unless the particular circumstances in the examples adduced are accurately detailed: but so far as we have the evidence before us, the inference is plain;—whatever may be urged in vindication of the theory of stimulation to the extent directed in the Essay on Burns; the successful cases brought forward in proof, were not treated upon that principle. I must again call the reader's attention to the expression of this principle as a rule of prac-

tice—"that the internal means of relief will be to administer those substances which will, in the quickest and speediest manner possible, throw the heart and arteries into the most violent action compatible with life;"—but in the three last cases related, the stimulants employed were quite inadequate to such violent effects; more especially in that of Mr. Hopper, the whole amount of the internal stimulation being no more than "sixty drops of laudanum in a bumper of brandy:"—neither does any other medicine appear to have been employed, except "an ounce of sulphate of magnesia on the fifth day." I must here request the reader to bear in remembrance that the case of Mr. Hopper is adduced in order to evince the superiority of the new theory in its application to practice—and to be triumphantly compared with the case of John Thompson, which was brought forward to show the pernicious result of the antiphlogistic treatment.

I am glad to admit the celerity and perfection of the cure (in Mr. Hopper's case) "which went through the different stages of irritation, suppuration, and cicatrization, all

in the short space of six days :”—but I cannot concede that this treatment “ was conducted scrupulously upon the principle previously laid down for such accidents ;”—nor can I, without certain limitations, perceive the propriety of the following conclusion : “ In my treatment of cases of this nature, I think, says Dr. Kentish, I may venture to use the motto of ASCLEPIADES, *Tutò, celeriter, et jucundè.*”

The remaining cases presented in the Essay on Burns confirmatory of the justness of the theory proposed, are few, and will sufficiently speak for themselves. They appear to have been judiciously treated : but, in my opinion, they adduce no evidence either favourable to the theory which aims at restoring a unity of action between a burnt part and the system at large by exciting the latter, through the medium of internal stimulation, to meet the morbid increase of the former ; or, to the practical measures suggested to produce the curative effect.

The first is the case of GEORGE CLARK, who was severely burnt ; a cordial draught with sixty drops of tincture of opium, and two

drachms of vitriolic ether, was given; also a volatile cordial julep; the anodyne was repeated at night, with forty drops of tincture of opium; and the same was to be given on the following morning: he was allowed to drink hot wine and water in equal parts, if thirsty.

Second Day.—He had taken more than a pint of wine with hot water. The medicines and wine continued, except that the ether was omitted in the anodyne—panada with wine.

Third Day.—A large glyster; the diet and medicines continued.

Fourth Day.—The wine was withheld, the stimulating julep was desisted from, and only the anodynes continued; even these were diminished.

Fifth Day.—Continued as before—until the ninth day, when an anodyne absorbent mixture was directed to restrain a diarrhœa. He was perfectly cured in less than three weeks.

The second is the case of THOMAS PYLE. “He was treated according to the principles already laid down, both internally and externally.—The accidental diarrhœa produced such an effect upon Clark’s system, that he

was cured sooner than this boy.”——“ I endeavoured in some degree to imitate this effort of nature by a brisk purge. It produced a very marked good effect. At the interval of a week I repeated the purge.”

Dr. Kentish immediately afterwards remarks, “ the practice of giving a purge at the interval of a week was trifling and timid ;” I should now give one every other day, or a solution of epsom salts, every day. “ Between the purgations, the diet was *nutritive*, but not *stimulating* : all fermented liquors were forbidden, and nothing hot was allowed.

“ The third case is that of JOHN DUNWIDDIE. He was in exquisite torture, crying, shivering, and stamping about the room, as if mad. I instantly gave him a powerful anodyne, which was repeated at night. In the course of ten days he was tolerably well, except that a tenderness about the eyes remained, which yielded to a few brisk purges, and a collyrium with sulphate of zinc.”

Of these three cases I must remark that the internal stimulation, although it may appear to have been rather too liberally applied in the first of them ; yet was it only continued

for a short time; and in a young miner of “vigorous constitution” was, assuredly, not sufficiently powerful to meet the rule drawn from the theory. The same observation applies to the second case, in which great reliance appears to have been placed in the purgative exhibition, and much caution observed in the regulation of the diet.

In the third case, no other internal stimulant appears to have been given than a “powerful anodyne,” which was once repeated. These examples, therefore, cannot be received as evidence sufficient to establish the truth of a theory which enjoins, in the case of Burn and Scald “where the action of parts is alone increased,” such internal stimulants as will, “in the quickest and speediest manner possible, throw the heart and arteries into the most violent action *compatible with life*.”

In addition to the above cases, Dr. Kentish adduces the following testimonies of others, “to corroborate and establish the practice.” MR. HAMMICK, jun. remarks “the success of the practice was so great, that it was engraven so forcibly on my mind as not to be

easily effaced.”—Mr. H. also observes, “I immediately applied the spirit of turpentine, in a full and free manner; though I must admit, that I did not give my patient, internally, the liberal allowance of spirit and laudanum which you have so forcibly recommended. The application of the turpentine was attended with much burning and smarting, as the patient expressed it, for about an hour; at the expiration of which, he fell asleep and rested tolerably for about two hours; and, when he awoke, he declared that he found himself much relieved. The after stages, however, were nearly, if not quite as slow as in those patients, who had been treated by the cold applications.”

In the case of GEORGE SMITH related by Mr. Horn, that gentleman very judiciously gave him immediately a tumbler glass full of strong gin and water. The man appears to have suffered severely: “he was (says Mr. H.) the most severely burnt of any patient who ever came under my care.”——“He had frequent shiverings; and, although a very resolute man, complained much of pain.”—The gin and water was repeated, to which was added sixty drops of laudanum.

Second Day.—Sixty drops of laudanum in a little spirit and water, to be taken at bed-time. Allowed gin and water, to be taken when shivering should occur.

Third Day.—He is forbid the use of spirits, but allowed porter. His anodyne continued.

Fourth Day.—Anodyne continued.

Fifth to the Eighth Day.—Bowels open; allowance of porter diminished.

Ninth Day.—Five grains of calomel at night, and a purge in the morning.

Fifteenth Day.—The anodyne continued:—five grains of calomel at night, and a smart purge in the morning.

The case of JOHN WEATHERSPOON related by Mr. Fife was very severe. “ I found him (Mr. F. observes) almost frantic with pain, and trembling to as great a degree as any one I ever saw during the cold stage of an ague.” I gave him a draught containing fifty drops of laudanum; he was allowed to live as usual without restraint, and his cure was complete within three weeks from the accident.

The above cases of GEORGE SMITH and JOHN WEATHERSPOON, are sufficiently in

proof of the propriety of resorting to the employment of anodynes and a moderate measure of stimulation in examples of such severity as these cases afford. But if this moderate degree of internal stimulus (gin and water, occasionally repeated, with the addition of an anodyne, and in the last case, one dose of the anodyne only) was found sufficient where the circumstances of the injury appear to have been particularly urgent; in what manner can such cases be regarded confirmatory of the theory which extends the rule of violent stimulation through the whole circle of diseased actions in Burn and Scald, not alone when exhaustion has supervened to excessive action, but in those lesser degrees of injury “where the action of parts is alone increased?”

In considering from the evidence adduced, the extent to which Dr. Kentish's rule of practice was carried in conformity to the tenets of the theory; I am led to remark, that the cases last adverted to, appear to have been, generally, of great severity from the detail of symptoms: most of them occurring to young colliers or miners, very probably,

of intemperate habits; as may be inferred from their predilection to generous living, which has been mentioned by Dr. Kentish. Hence the practice pursued was, in the main, judicious; it was judicious as applied to this class of injury, constitution, and habits—but if regulated by the theoretical rule prescribed, would have been detrimental: for to have “thrown the heart and arteries into the most violent action compatible with life,” a much more highly stimulant exhibition would have been required. Opium was chiefly relied on, and it was given in doses, and under circumstances, that would rather lower than elevate the vital energies and action. It was applied to systems under the influence of exquisite pain, and, probably, exhaustion; to systems not easily excited, even in health, into violent action, except by powerful doses of the most diffusible stimulants; the inordinate quantities of which, as occasionally taken by the hard labouring classes of the community without immediate ill consequence, are sometimes surprising, and, perhaps, have never been equalled by the most powerful application of Dr. Kentish’s means. These I am therefore

inclined to consider to have been beneficial in the examples recorded, because their application was made to those constitutions which are found to possess a diminished susceptibility to the impressions of ordinary degrees of internal stimulation, from long habits of indulgence in excess.

The effect of anodyne and stimulant exhibitions in painful diseases, in particular states of debility, or on particular habits, cannot be calculated from a consideration of their degree of action in the condition of health. The quantity of stimulant, or anodyne medicine, that would at first greatly overpower and ultimately exhaust the vital energies in a delicate constitution unaffected by actual disease, would produce no appreciable effect upon a vigorous frame—or under the pressure of severe pain—or where the measure of stimulation is ordinarily excessive; even though the degree of stimulant or anodyne agency should be much increased. Thus we are told of immense quantities of wine having been taken by patients in certain fevers, without deranging the functions of the brain, or exciting the actions of the sanguiferous system.

—quantities that would in the common state of health of the patient have most certainly produced inordinate intoxication: and I have repeatedly given much larger doses of opium in combination with wine and cinchona, in tetanus, without inducing the slightest perceptible effect, than have been employed by Dr. Kentish, whose object in the exhibition of stimulants was expressly intended to “excite the action of the heart and arteries to the greatest possible degree compatible with life.”

It affords, I think, much satisfaction, that the practice pursued by Dr. Kentish in the several severe cases of Burn related by him, and by his respected correspondents, was not carried to the extent implied by the theoretical injunction. The means used were quite insufficient to induce such violent effects. But if thus fortunately within a dangerous degree of stimulant agency in the cases to which they were beneficially applied; yet, would they have proved, in my opinion, highly injurious if directed to those cases, “in which the action of parts is alone increased;”—in which general inflam-

mation, the consequence of constitutional sympathy with the injured surface would demand,—not stimulants to remove a disparity of action, by raising the system to the morbid degree of excitement of the injured part;—not “cooling purges, with nitre powders, decoctum antiemeticum, or some cooling febrifuge drinks,” which was the practice *first* pursued by the Author of the Essay on Burns; but, cold evaporating applications, bleeding, purging and the antiphlogistic regimen, agreeably to the degree of injury and morbid state, with the view to diminish heat and vital action, both topical and general. For, to use the words of Dr. Thomson,—“I do not remember a case of Burn in which bleeding was employed, where it seemed to be followed with injurious effects.”—“If the inflammation increases, vesications are liable to form, and a symptomatic fever, proportioned in some degree to the extent of the local injury, and to the more or less irritable nature of the patient’s constitution, is almost always produced. The indications of cure are extremely simple. We must endeavour to remove the inflam-

mation, and by this means to prevent the formation of blisters.”*

Dr. Kentish, it appears to me, did not succeed when he pursued his *first* practice, because it was not the antiphlogistic treatment which he afterwards so much condemned. In the case selected to show the ill effect of the antiphlogistic plan, that plan was carried to a very insufficient extent. The patient appears to have died from the inordinate general excitement, accompanied by cerebral inflammation.

In his subsequent experience Dr. Kentish was successful in a much greater degree; because, according to my view, the practice was simply anodyne and *moderately* stimulant. In the case to which the excitative treatment was applied to the fullest extent, the patient died with symptoms strictly analogous to those which characterized the example last recurred to; while in those cases, in which the stimulant exhibition was more sparingly employed, the patients recovered; although this salutary moderation was in direct opposition to the fiery tenets of the

* Thomson's Lectures on Inflammation.

theory. This theory appears to me to be much too general for particular application. It disregards age, sex, habits, and temperaments, —circumstances of unquestionable importance: inattention to which has often rendered it impossible to draw any accurate conclusion for or against a particular principle or practice founded thereon, by comparing the results from the statements of individual cases; for “peculiarities of constitution in particular individuals, often occasion striking diversities in the appearance of Burns, and in the effects which different remedies produce upon them; so that of a number of the severe cases of Burns, at first perfectly similar in appearance, and treated in every respect after the same way, you will not find that any two heal precisely in the same manner.”*

CONCLUSION.—1. The terebinthinate dressing to Burns and Scalds does not appear to be either new, or peculiar in its remedial action, or so particularly beneficial as to recommend its adoption to the exclusion of many other applications.

2. The details of Dr. Kentish do not ap-

* Thomson's Lectures on Inflammation.

pear unfavourable to the employment of refrigerant applications—those of many other writers and my personal experience establish their utility, as well as perfect safety.

3. The evidence adduced to point out the pernicious effects of the antiphlogistic treatment, I think, must be deemed inconclusive; while the necessity for its employment on certain occasions, I trust has been made sufficiently apparent by the various testimonies advanced in the preceding pages.

4. The internal stimulant practice, when employed to the full extent enjoined by the theory of Dr. Kentish, appears to have failed.

5. When the stimulant treatment succeeded, it does not seem to have been carried to so great an extent. It does not appear to have been adopted except in cases of severity, in which from the detail of symptoms, we must consider a great degree of exhaustion to have been produced by the violence of the injury. In which case, moderate stimulation was indicated; but upon a principle that would make its application pernicious in those numerous examples of less severity in which there merely ensues inflammation—"only increased action."

6. This view of the subject affords great satisfaction; inasmuch as it provides for a ready assent to the accuracy of the practical records adduced in the Essay on Burns, although the theory proposed should be deemed erroneous.

“As the conduct and practice of every person is governed more or less by the theory which he embraces, and as false theories have done irreparable injury to society in all ages, the opinion which I entertain of the dangerous tendency of the doctrine on which I have made the preceding remarks, is the inducement for thus pointing out what appears to me to be some of its errors, and I hope will be considered as a sufficient apology for the freedom I have used, especially as there are but few things of more importance, or more to be desired in this world, than the establishment of truth, on a subject which has the welfare of mankind for its object.”

THE END.

